NUREG/CR-4152
BNL-NUREG-51858

AN INDEPENDENT SAFETY ORGANIZATION

W.Y. Kato, E.V. Weinstock, J.F. Carew,
R.J. Cerbone, J.G. Guppy, R.E. Hall and J.H. Taylor

With Contributions from
J. Mark Elliott
International Energy Associates Ltd.
Washington, D.C.

and

M.A. Rowden and S.E. Fowler
Fried, Frank, Harris, Shriver & Kampelman
Washington, D.C.

February 15, 1985

DEPARTMENT OF NUCLEAR ENERGY, BROOKHAVEN NATIONAL LABORATORY
UPTON, LONG ISLAND, NEW YORK 11973

Prepared for the U.S. Nuclear Regulatory Commission
Office for Analysis and Evaluation of Operational Data
Contract No. DE-AC02-76CH00016

NOTICE

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, or any of their employees, makes any warranty, expressed or implied, or assumes any legal liability of responsibility for any third party's use, or the results of such use, of any information, apparatus, product or process disclosed in this report, or represents that its use by such third party would not infringe privately owned rights.

NOTICE

Availability of Reference Materials Cited in NRC Publications

Most documents cited in NRC publications will be available from one of the following sources:

1. The NRC Public Document Room, 1717 H Street, N.W.
   Washington, DC 20555

2. The NRC/GPO Sales Program, U.S. Nuclear Regulatory Commission,
   Washington, DC 20555

3. The National Technical Information Service, Springfield, VA 22161

Although the listing that follows represents the majority of documents cited in NRC publications, it is not intended to be exhaustive.

Referenced documents available for inspection and copying for a fee from the NRC Public Document Room include NRC correspondence and internal NRC memoranda; NRC Office of Inspection and Enforcement bulletins, circulars, information notices, inspection and investigation notices; Licensee Event Reports; vendor reports and correspondence; Commission papers; and applicant and licensee documents and correspondence.

The following documents in the NUREG series are available for purchase from the NRC/GPO Sales Program: formal NRC staff and contractor reports, NRC-sponsored conference proceedings, and NRC booklets and brochures. Also available are Regulatory Guides, NRC regulations in the *Code of Federal Regulations,* and *Nuclear Regulatory Commission Issuances.*

Documents available from the National Technical Information Service include NUREG series reports and technical reports prepared by other federal agencies and reports prepared by the Atomic Energy Commission, forerunner agency to the Nuclear Regulatory Commission.

Documents available from public and special technical libraries include all open literature items, such as books, journal and periodical articles, and transactions. *Federal Register* notices, federal and state legislation, and congressional reports can usually be obtained from these libraries.

Documents such as theses, dissertations, foreign reports and translations, and non-NRC conference proceedings are available for purchase from the organization sponsoring the publication cited.

Single copies of NRC draft reports are available free, to the extent of supply, upon written request to the Division of Technical Information and Document Control, U.S. Nuclear Regulatory Commission, Washington, DC 20555.

Copies of industry codes and standards used in a substantive manner in the NRC regulatory process are maintained at the NRC Library, 7920 Norfolk Avenue, Bethesda, Maryland, and are available there for reference use by the public. Codes and standards are usually copyrighted and may be purchased from the originating organization or, if they are American National Standards, from the American National Standards Institute, 1430 Broadway, New York, NY 10018.

GPO Printed copy price: $8.00

NUREG/CR-4152
BNL-NUREG-51858

AN INDEPENDENT SAFETY ORGANIZATION

W.Y. Kato, E.V. Weinstock, J.F. Carew,
R.J. Cerbone, J.G. Guppy, R.E. Hall and J.H. Taylor

With Contributions from
J. Mark Elliott
International Energy Associates Ltd.
Washington, D.C.

and

M.A. Rowden and S.E. Fowler
Fried, Frank, Harris, Shriver & Kampelman
Washington, D.C.

February 15, 1985

PREPARED FOR U.S. NUCLEAR REGULATORY COMMISSION
OFFICE FOR ANALYSIS AND EVALUATION OF OPERATIONAL DATA
WASHINGTON D.C. 20555
CONTRACT NO. DE-AC02-76CH00016
FIN D-1358

ABSTRACT

Brookhaven National Laboratory has conducted a study on the need and feasibility of an independent organization to investigate significant safety events for the Office for Analysis and Evaluation of Operational Data, USNRC. This is being carried out in response to a Congressional request to the NRC for such a study.

The study consists of three parts: the need for an independent organization to investigate significant safety events, alternative organizations to conduct investigations, and legislative requirements. The determination of need was investigated by reviewing current NRC investigation practices, comparing aviation and nuclear industry practices, and interviewing a spectrum of representatives from the nuclear industry, the regulatory agency, and the public sector.

The advantages and disadvantages of alternative independent organizations were studied, namely, an Office of Nuclear Safety headed by a director reporting to the Executive Director for Operations (EDO) of NRC; an Office of Nuclear Safety headed by a director reporting to the NRC Commissioners; a multi-member NTSB-type Nuclear Safety Board independent of the NRC. The costs associated with operating a Nuclear Safety Board were also included in the study.

The legislative requirements, both new authority and changes to the existing NRC legislative authority, were studied. These legislative requirements were based upon the Edwards-Udall Bill H.R. 6390 introduced in the 96th Congress and a study of the NRC Organization Act.

ACKNOWLEDGEMENTS

Since there were significant time limitations placed on BNL to conduct this study, it was necessary to depend upon oral and written information provided by informed individuals within the nuclear and aviation regulatory agencies and industries and the public sector. This study to a large extent is based upon the interviews conducted by the BNL Task Force with over 40 key persons from such organizations as:

- Nuclear Regulatory Commission (NRC)
  - Advisory Committee on Reactor Safeguards (ACRS)
  - Office for Analysis & Evaluation of Operational Data (AEOD)
  - Office of Nuclear Reactor Regulation (NRR)
  - Office of Nuclear Regulatory Research (RES)
  - Office of Nuclear Material Safety & Safeguards (NMSS)
  - Office of Inspection & Enforcement (I&E)
  - Office of Investigations (OI)
  - Executive Director for Operations
  - Regional Offices
  - Former NRC Commissioners
- Federal Aviation Administration (FAA)
- National Transportation Safety Board (NTSB)
- Air Carriers
- Airframe Manufacturers
- The Air Line Pilots Association
- The Association of Flight Attendants
- The Aviation Consumers Action Project
- Environmental Protection Agency (EPA)
- Occupational Safety & Health Administration (OSHA)
- Institute of Nuclear Power Operations (INPO)
- Electric Power Research Institute - Nuclear Safety Analysis Center
- Utilities
- Nuclear Vendors
- Union of Concerned Scientists
- Staff of Governor of the State of Pennsylvania

The authors of this report gratefully acknowledge the contributions made by individuals from these organizations who gave freely of their time and made this report possible. Special appreciation is expressed to Mr. J. Peter Kissinger, Managing Director of the National Transportation Safety Board, and Mr. Anthony J. Broderick, Deputy Associate Administrator for Aviation Standards of the Federal Aviation Administration, for their patience and help in responding to numerous calls for information about their respective agencies.

TABLE OF CONTENTS

TABLE OF CONTENTS (Cont'd)

TABLE OF CONTENTS (Cont'd)

Page

TABLE OF CONTENTS (Cont'd)

EXECUTIVE SUMMARY

The establishment of a Nuclear Safety Board (NSB) independent of the Nuclear Regulatory Commission (NRC) and patterned after the National Transportation Safety Board (NTSB) for the investigation of operational events and accidents at nuclear power plants was suggested by Prof. H. W. Lewis of the University of California, Santa Barbara, in 1977. Following the accident at Three Mile Island Unit 2, the Kemeny Commission and the Rogovin Special Inquiry both recommended the establishment of an independent organization to investigate and assess operational events. In 1980, Congressman Udall introduced a bill, HR 6390, for the creation of an independent Nuclear Safety Board to investigate incidents at nuclear power plants. In 1984 Congress requested the NRC to determine the need for and feasibility of establishing an independent organization to investigate significant safety events at NRC-licensed facilities.

This study of an independent safety organization by Brookhaven National Laboratory (BNL) for the NRC Office for Analysis and Evaluation of Operational Data (AEOD) is in response to that request. It examines three main issues: 1) the need for an independent organization, 2) alternative organizational structures for such a body, and 3) the legislative authority needed to establish it.

The question of the need for an Independent Safety Organization (ISO) in the nuclear industry was pursued by a limited study of the current practices for the investigation of operational events by the NRC and the Institute of Nuclear Power Operations (INPO), and a sampling of opinions of a spectrum of key informed individuals from the NRC, INPO, EPRI, utilities, vendors, and the public sector. A study was also conducted of the practices for investigation of operational events and accidents by the Federal

Aviation Administration (FAA) and National Transportation Safety Board (NTSB) in the aviation industry, for possible application to the nuclear industry. Because of the severely limited time available for this study, the justification of need for an ISO is based heavily on the opinions expressed in the various interviews and on the judgments of the members of the BNL Task Force.

The current NRC investigatory practices for operational events directly involve the Offices of Nuclear Reactor Regulation (NRR), Inspection & Enforcement (I&E), Nuclear Material Safety & Safeguards (NMSS), Analysis and Evaluation of Operational Data (AEOD), and the Regional Offices. NRR, I&E, and the Regions are principally involved in the immediate and short-term investigation of operational events at nuclear power plants. AEOD, on the other hand, emphasizes long-term studies of operational events for pattern and trend analysis. The NRC Resident Inspector who reports through the Regional office is the principal contact with the utility operating staff and is usually the first NRC person on site to initiate an investigation of an event. The NRC, however, must depend primarily upon the operating staff of the utility for prompt notification and accurate description of an event to determine its significance. The NRC currently receives notification of about 200 unusual events per year from nuclear power plants, of which about 8 are in the alert emergency category under the 10 CFR 50.72 criteria. These are screened for their significance. In addition, the NRC receives and screens approximately 2,200 Licensee Event Reports (LERs) per year under the revised 10 CFR 50.73 criteria, of which about 70-140 LERs per year have some significance, and about 8-10 events per year are classified as abnormal occurrences that require detailed investigation and may include on-site visits.

The NRC Office of Inspection & Enforcement may issue Information Notices or Bulletins following an event with recommendations to prevent its recurrence. AEOD, which conducts long-term studies, issues reports on case studies, engineering evaluations, technical review, and special studies as a result of its investigations of significant events at nuclear power stations. Since AEOD's establishment in 1980 (after the TMI-2 accident), it has issued over 270 reports in these areas. The AEOD also publishes Power Reactor Events, which is a bi-monthly newsletter that compiles operating experience information, including summary descriptions of events at commercial nuclear power plants.

The Institute of Nuclear Power Operations (INPO) and the Electric Power Research Institute's (EPRI) Nuclear Safety Analysis Center (NSAC) were both organized following the accident at Three Mile Island Unit 2 (TMI-2) to provide increased awareness of and responsiveness to the need for improved safety at nuclear power plants. INPO's responsibility is to focus on problems associated with direct operations of nuclear power plants, whereas NSAC focuses on studies of postulated and low probability events and the investigation of generic safety matters.

INPO has a division which investigates operational events at nuclear power plants. This group screens about 10,000 reports per year, which include LERs, construction deficiency reports, operational data, component failure data, etc. INPO classifies these incidents as either significant or non-significant. A non-significant event can provide the basis for an Operations and Maintenance Reminder which takes the form of an informative note to participating parties regarding specific details concerning component performance or maintenance.

If an event is significant, a Significant Event Report (SER) is written. Action beyond the initial report, which may include telephone contact with the operating staff and on-site visits, is initiated. This may result in detailed analysis and recommendations and the issuance of a Significant Operating Experience

Report (SOER). The SER is a brief technical description of an event similar to an LER, while the SOER contains a description, analysis, conclusions, and, if appropriate, generic recommendations. INPO produces 80-100 SERs and 10-15 SOERs per year.

The NRC investigation of several recent Abnormal Occurrences has been reviewed. The events reviewed include: 1) Three Mile Island, 2) the Salem-1 failure to scram, 3) the improper control rod manipulation at Quad Cities-1, 4) the Browns Ferry-3 partial scram, 5) the Hatch-2 uncontrolled leakage outside primary containment, and 6) the exposure of workers' hands at Nuclear Metals, Inc. Based on the review of these events, it is concluded that the NRC investigations are carried out in a generally professional and competent manner, with some exceptions, and appear to satisfy their regulatory objective. However, with respect to fact finding and probable cause determination, the following areas have been identified for possible improvement: 1) the timeliness of identification of events and investigation reports, 2) the overlap and interference with each other of the various NRC, INPO licensee and equipment vendor investigations, and 3) the perceived adversarial nature of the NRC investigations resulting from their being conducted by the regulation and enforcement staff of the NRC. It is also noted that while the NRC, licensee and equipment vendors all investigate major events, each party tends to focus on its own area of responsibility and not necessarily on the determination of cause. While the review of these events has not identified any instance of investigatory bias, a potential for conflict of interest does exist, since NRC's prior action or inaction may have been a partial contributor to the cause of an event.

The system used by the National Transportation Safety Board and the Federal Aviation Administration to investigate aircraft accidents and incidents was studied as a possible model for the nuclear case. In addition to reviewing the accident investigation procedures, interviews were conducted with personnel of the NTSB and FAA, several major airlines, airframe manufacturers, professional associations for airline pilots and flight attendants, and a consumers' group active in airline safety to obtain a wide spectrum of opinions on the workings and effectiveness of the system.

Certain characteristics of the investigatory system were of particular interest. The most important of these were: 1) the use of a single coordinated investigation in which the FAA participated but which was directed by an agency (the NTSB) entirely independent of the regulatory body; 2) the emphasis on objective fact-finding and the determination of cause as the main purpose of the investigation; 3) the use of a "party" system employing technical experts from the concerned carrier, aircraft manufacturer, the airline pilots', flight attendants', and air traffic controllers' associations, and other groups having technical expertise relevant to the investigation; and 4) the public issuance of non-binding recommendations for improvements to prevent a recurrence of the accident or incident, with the legal requirement for a public response by the FAA.

It was felt that these four features of the aviation industry, if adopted in the nuclear area, could contribute significantly to the improvement of investigations of safety-related events. The first two would focus investigations more strongly on cause but also supply much of the factual basis for regulatory and enforcement action, while, at the same time, avoiding any conflict of interest on the part of the investigating body. The third would make available a much wider pool of experts for investigations than is now the case; the fourth would provide a strong incentive for expediting the adoption of safety improvements.

The BNL Task Force was impressed by the nearly unanimous praise of the interviewees for the fairness, objectivity, and effectiveness of the NTSB system. Although the fact-finding phase of the investigations serves as the basis for both the determination of cause and potential enforcement actions, it is marked by a cooperative, non-adversarial spirit that seems to account in large measure for the effectiveness of the investigations. This spirit appears to be fostered by three main factors: 1) the direction of the investigations by an agency divorced from the regulatory, licensing and enforcement functions; 2) the emotional impact of an aviation disaster on the investigators; and 3) the esprit de corps and camaraderie that still permeate the field of aviation.

The NTSB has other responsibilities in addition to the conduct of accident investigations. Of chief interest for the present study is the responsibility for conducting special studies of transportation safety, including statistical (trend) analyses, and deriving recommendations for improvements on the basis of these. This activity, together with the accident investigations, provides the NTSB with a medium for overseeing the operation of the FAA in a selective way.

The applicability of the aviation model to the nuclear area depends on the degree of similarity of the two industries and their regulatory bodies. The use of complex equipment and advanced technology, the necessity for redundant safety systems, the large capital cost of the equipment, and the extensive regulation by government agencies are obvious similarities. However, there are important differences also. Airlines compete with each other; utilities do not -- a situation which may affect responsiveness to public concerns. The FAA has a statutory obligation to both regulate and promote aviation; the NRC has, by law, only a regulatory role. The FAA, through its air traffic control system and the operation of navigational aids, has a direct operational role in the activity it regulates; the NRC does not. Commercial aviation has had many fatal accidents throughout its history; the commercial nuclear power industry has had none.

The capital cost of a nuclear plant is far greater than that of a commercial aircraft; therefore, there is greater urgency to place a nuclear plant back on line after an event. It is not possible to shut down a nuclear plant completely as it is an aircraft because of decay heat considerations. This may require rapid repair of components or systems, which may preclude "freezing" of equipment or personnel after an event for use as evidence in an investigation.

Perhaps one of the more important differences is that the need for commercial aviation is not questioned by any significant segment of the population and the public appears to accept the risks of flying, while nuclear power has been a subject of controversy and has been opposed by a vocal segment of the population.

Some of these differences between the two industries weaken the case for the direct application of an NTSB-type totally independent organization for investigating significant events to the nuclear industry.

The study of the current practices for the investigation of operational events by NRC and INPO to determine cause found them to have generally been conducted in a proficient and technically competent manner, with some exceptions. However, a number of improvements are needed in this area. These include:

a) A more structured and coordinated approach to the investigation of significant events to minimize the number of overlapping investigations and to focus on fact finding and determination of cause as the primary goal.

b) Procedures to "freeze" plant conditions and personnel as soon as possible after a significant event to preserve the evidence for fact finding.

c) Separation of fact finding from determination of regulatory compliance to minimize the adversarial relationship between NRC and utility personnel and to minimize a potential confict of interest on the part of the NRC staff due to its prior licensing, regulatory or enforcement actions or omissions.

d) Requiring investigators to have greater operating experience and training in conducting investigations.

e) More accurate and timely descriptions of operational events and identification of significant events.

f) Improved feedback in a more timely manner of the results of the investigations, including determination of cause, to the utilities and the public and more timely consideration of the recommendations.

Three alternative independent safety organizations for the investigation of significant safety events and determination of cause have been considered, namely, an Office of Nuclear Safety reporting to the Executive Director for Operations within the NRC, an Office of Nuclear Safety reporting directly to the Commissioners, and a Nuclear Safety Board independent of the NRC. It is proposed that common to each of the three alternatives would be a structured and coordinated investigation system employing the "party" approach used by the NTSB. In addition, a designated representative system using utility staff is proposed to aid in the identification of significant events. A comparison of the advantages and disadvantages of each of these alternatives is made. The principal difference between the three alternatives is the degree of independence the organizations would have from the regulatory, licensing, and enforcement arms of the NRC. Some degree of independence is required in order to avoid a potential conflict of interest of the NRC staff, as discussed earlier.

Studies of the additional legislative authority and possible changes in the NRC legislative authority required for the establishment of a Nuclear Safety Board independent of the NRC, as well as for the establishment of a statutory Office of Nuclear Safety within the Commission, were conducted by M. A. Rowden and S. E. Fowler of the legal firm of Fried, Frank, Harris, Shriver & Kampelman of Washington, D. C.

The analysis of the required additional legislative authority was based upon a review of Title IV of H.R. 6390 introduced by Rep. M. K. Udall in January 1980, which was a comprehensive package of amendments to the Atomic Energy Act of 1954, and studies of the acts establishing the NTSB and NRC. The legislation needed to establish a Nuclear Safety Board is provided in Appendix A.

A study of the act establishing the NRC, which is contained in Appendix B, indicates that the NRC has sufficient authority to establish an Office of Nuclear Safety within the Commission. A statutory ONS reporting to the Commissioners, as described in Section 4.9, would obviously require changes in the NRC Organization Act.

There are currently about 8-10 significant events/year requiring investigation. For the immediate future with about 85-90 nuclear plants in operation, it is estimated that the number of significant events requiring full field investigation will be less than about 12 events per year. This number will probably not exceed 20-25 per year when all 129 present nuclear power plants and those under construction are operating. It is also anticipated that the number of significant events should decrease as improved operational practices, including maintenance and more reliable equipment, are implemented. Given these small numbers, the size of the technical staff required for a new agency should be correspondingly small, probably totalling less than about 125 employees. It is felt that this small size would have certain serious disadvantages which would adversely affect the viability of a separate agency. These disadvantages would disappear if the new organization were to be part of NRC but were to report directly to the Commission, thus divorcing it from all regulatory, licensing, and enforcement functions.

In conclusion, the BNL Task Force, based upon this study, recommends the establishment initially of a statutory Office of Nuclear Safety (ONS) headed by a director reporting to the Commissioners, which would be totally responsible for fact-finding and determination of cause of operational events and would also absorb the current responsibilities of the AEOD. Although many of the improvements identified as needed by this study could be accomplished by the present organization, the judgment of the BNL Task Force is that they could be more easily and rationally implemented by a new organization separated entirely from the regulatory and compliance arms of the NRC and focused on fact-finding and determination of cause of significant events. The greater independence should inspire greater public confidence in the investigatory process, and the increased stature and enhanced visibility would help to ensure timely consideration and implementation of its recommendations.

Since it is estimated that in the next three or four years there will be no more than about 12 significant events per year requiring full field investigations, it is recommended that the ONS have a total staff of about 80. This represents an additional 30 technical staff for investigative work (15 at Headquarters and 15 distributed in the five regional offices) over the currently anticipated staff of about 50 for AEOD. If the number of events to be investigated were to increase significantly, requiring a substantial increase in technical investigators, or if a greater oversight role over the NRC than is envisioned here is deemed desirable, then the establishment of an NSB independent of NRC should be considered. This progressive development towards greater independence would be similar to the history of the independent NTSB which, at its inception, was a part of the Department of Transportation. However, a strengthened ACRS with a broader scope could also provide the oversight function.

1. INTRODUCTION

1.1 Background

In November 1977, Professor Harold W. Lewis of the Department of Physics, University of California, Santa Barbara, introduced the concept of a Nuclear Safety Board in a letter to Rep. Morris K. Udall, Chairman of the House Committee on Interior and Insular Affairs. Professor Lewis suggested the establishment of a Nuclear Safety Board independent of the Nuclear Regulatory Commission (NRC) and patterned after the National Transportation Safety Board (NTSB). Professor Lewis suggested the creation of an independent, quasi-judicial organization to review and analyze nuclear accident precursors and to recommend corrective actions to prevent similar or more serious events in the future. At that time the Advisory Committee on Reactor Safeguards (ACRS) and the Commission recommended against a NTSB-type review board.

The Kemeny Commission and the NRC's Special Inquiry Group (Rogovin Inquiry), following the Three Mile Island-2 (TMI-2) accident, made recommendations regarding the evaluation and assessment of abnormal occurrences at nuclear power plants. The Kemeny Commission recommended that the NRC establish "a program for the systematic assessment of experience in operating reactors, with special emphasis on discovering patterns in abnormal occurrence". The formation of the Office for Analysis and Evaluation of Operational Data (AEOD) in 1980 was a consequence of the recommendation.

The Rogovin Inquiry was more specific in its recommendations regarding the establishment of an independent Nuclear Safety Board which would:

- exercise oversight on the effectiveness of the licensing review process and the regulation of existing plants;
- advise the administrator on regulatory goals and important issues for rulemaking;
- act as an ombudsman group to receive complaints and technical dissents;
- enhance reactor safety by monitoring the effectiveness of the Office for Analysis and Evaluation of Operational Data's review of operating experience and of all other operational feedback;
- monitor the staff's use of the latest analytical and design tools, and ensure that modern safety technology is applied throughout the agency's activities;
- develop and maintain a capacity to investigate accidents and important safety-related incidents, independent of all other offices of the NRC and the Commission or Administrator.

The Rogovin Inquiry proposed a much wider scope Board by suggesting that:

> "The independent Board we envision has an analog in the National Transportation Safety Board (NTSB), which investigates aviation accidents independently of the FAA. But we envision a much larger role for the Nuclear Safety Board in providing a quality assurance function for the agency's regulatory process as a whole .... We suggest that the Nuclear Safety Board might be composed of five full-time members who would also be members of the ACRS."

On November 1, 1979, Rep. Mickey Edwards introduced a legislative proposal for a Nuclear Safety Board as H.R. 5775 in the 96th Congress. Rep. Udall re-introduced H.R. 5775 as Title IV of H.R. 6390 in January 1980 as a group of amendments to the Atomic Energy Act of 1954. H.R. 6390 would have established an independent Nuclear Safety Board to conduct "independent investigations of incidents involving nuclear facilities licensed by the Nuclear Regulatory Commission and recommend to the NRC improvements in licensing and related regulatory practice". In effect, the independent NSB would oversee the performance of the NRC and monitor the NRC's resolution of unresolved safety issues as well as investigate nuclear accidents and analyze operating data.

The House Interior Committee, which reported H.R. 6390 in September 1980, changed the functions of the NSB significantly. H.R. 6390 now would have authorized the Board to conduct investigations of nuclear safety incidents and recommend safety improvements to the NRC, but would not have the authority to oversee the performance of the NRC or to monitor the NRC's resolution of safety issues. H.R. 6390, although reported by the Interior Committee, was never enacted.

An amendment to the Fiscal Year 1985 Energy and Water Development Appropriations Bill requires the NRC to report to Congress on "the need for and feasibility of an independent organization responsible for conducting investigations of significant safety events, including significant operational incidents, at facilities licensed by the Commission, and for making reports of such investigations, and that such study shall include a discussion of:

"1) the need for and feasibility of an independent organization to investigate significant safety events, including significant operational incidents, at facilities licensed by the Commission and further including the types of events for which such an organization would be responsible;

"2) alternative approaches to the composition of such an organization and the functions it might perform;

"3) the various powers and authorities, including administrative authorities, that might be exercised by such an organization;

"4) the relationship of such an organization to the Commissions's existing offices, including, but not limited to, the Office of Investigations, the Office of Inspection and Enforcement, and the Office for Analysis and Evaluation of Operational Data, further including a discussion of the functions that such an organization might perform beyond those currently carried out by any such existing offices;

"5) the cost of setting up and operating such an organization;

"6) the need for additional legislative authority to establish such an organization;

"7) the advisability of separating determinations with respect to nuclear safety from all other issues to be considered by the Commission in issuing or reviewing licenses and the alternative procedural approaches both formal and informal, to include non-adjudicatory processes, that might be employed for the collection of facts, and the resolution of safety issues;

"8) the advantages and disadvantages of the present organization of the Commission for the determination of matters of safety, including an analysis of all existing procedural constraints on the Commission's abilities to carry out those functions effectively and efficiently, to include, but not limited to, the Commission's <u>ex parte</u> and separation of functions rules and the Commission's statutory responsibilities under the Government in the Sunshine Act."

It is clear that Congress envisioned a study which excluded consideration for the need for an organization to oversee the performance of the NRC.

1.2 Scope

The NRC, through its Office of Analysis and Evaluation of Operational Data (AEOD), placed a contract in late August 1984 with the Brookhaven National Laboratory's Department of Nuclear

Energy to carry out a study to meet Congressional requirements. This report represents the results of a study consisting of three tasks as outlined below in fulfillment of that contract.

Task 1

Conduct a detailed study of the need for a separate organization to investigate operational incidents. This study is to focus on all facilities licensed by the NRC, with particular emphasis placed on operational events at commercial power reactors. The study shall:

- Assess how significant safety events, including significant operational incidents, are investigated now by the NRC and other organizations in the nuclear industry, and determine if there are deficiencies in the effectiveness or efficiency of the existing process. This assessment should include an assessment of the NRC's investigation of past events considered to be particularly significant.

- Assess and compare the scope and extent of incident investigations conducted in other industries, e.g., National Transportation Safety Board (NTSB), and determine the advantages and disadvantages of such investigations in comparison to the nuclear industry.

- Determine if and what improvements or changes are needed regarding the manner, scope, number, coverage, or organizational responsibility of the NRC's incident investigation activities and practices.

- Should a need be identified to perform additional incident investigation activities or to perform such activities in a different manner, evaluate the strengths and weaknesses of alternative procedural approaches, both formal and informal, for the collection of facts associated with operational events and of alternative organizational arrangements to conduct such activities, such as:

- by a redirection of existing offices, such as AEOD;
- by a new NRC office reporting to the Commission or the EDO;
- by a new independent agency outside the NRC.

For each organization arrangement evaluated, address at least the following considerations:

- The need for separating incident investigations from other NRC responsibilities and issues, such as issuing, inspecting, or enforcing licenses.
- The relationship of the organization responsible for incident investigations to other NRC offices.
- The efficiency and effectiveness of the organizational structure in regard to resource needs, duplication of activities, flow of information, and ability to influence corrective actions through recommendations.
- The criteria for defining the type and number of events for which a new or revised organization should have responsibility.
- The effect of the Commission's ex parte and separation of functions rule and the Commission's statutory responsibilities under the Government in the Sunshine Act on the Commission's ability to investigate operational events.

Task 2

Based upon reasonable assumptions regarding the definition of "significant operational incidents" and the number of such events that may occur each year, conduct a study of the composition, size, and cost of alternative organizational approaches, including: 1) the redirection of existing NRC offices; 2) the establishment of a new office at the Commission or EDO level; or 3) the establishment of a new organization outside the NRC. The study shall:

- Assess the size, composition and organizational structure for the needed capability.
- Assess the cost of setting up and operating such an organization.
- Assess alternative approaches to the composition of such an organization.
- Assess the strengths and potential weaknesses of each organizational structure, particularly with regard to such factors as the ability to attract qualified individuals. A perspective would be useful on the effectiveness of each organizational arrangement based upon experience with similar activities in the nuclear and other activities.

Task 3

Conduct a study of the need for legislative authority to establish such an organization. The study shall:

- Assess the need for legislative authority to establish such an organization, including any changes in the NRC's legislative authority.
- Assess the various powers and authorities, including administrative authorities, needed by such an organization.
- Assess the existing legislative authority and powers of comparable organizations in other industries (e.g., NTSB and FAA).

The study was divided into three parts: 1) the determination of need for an independent safety organization (ISO), 2) identification of possible organizational structures and cost of an independent organization, and 3) the additional legislative authority needed to establish such an organization. BNL was assisted by International Energy Associates Limited (IEAL), an internationally known consulting firm knowledgeable about governmental organizations, and Fried, Frank, Harris, Shriver and

Kampelman (FFHSK), a prominent Washington law firm that includes Marcus A. Rowden as a partner, which is very knowledgeable on legislative authority regarding nuclear energy matters and nuclear energy regulation.

The determination of need for a Nuclear Safety Board (NSB) can be considered in two parts: 1) the need to improve current investigations, and 2) the need for an independent organization to carry out such investigations. The first part is studied out by reviewing the current investigation practices of operational events carried out by the NRC, the utilities, the Institute of Nuclear Power Operations (INPO), and the Electric Power Research Institute's (EPRI) Nuclear Safety Analysis Center (NSAC). An in-depth study is also made of the relationship between the Federal Aviation Administration (FAA) in the Department of Transportation (DOT) and the National Transportation Safety Board (NTSB), since the safety regulation of the aviation industry may be an approach for the safety regulation of the nuclear industry. Comparison of the two industries will help to illustrate applicability of the NTSB approach to the nuclear industry.

Since the effort and time allocated to BNL was approximately two months, which was too short to do an in-depth study of event investigation, much of the information regarding current investigation procedures as well as required improvements was obtained from interviews with a spectrum of representatives of the nuclear industry by a BNL Task Force.

The degree of independence of the regulatory agency is discussed by comparing three alternatives for an ISO to investigate significant events. The three options are: 1) a statutory Office of Nuclear Safety headed by a director reporting to the Executive Director for Operations; 2) a statutory Office of

Nuclear Safety headed by a director reporting to the Commission; or 3) a Nuclear Safety Board, a new agency independent of the NRC, composed of three or five members appointed by the President and confirmed by the Senate, similar to the NTSB.

The study concludes with an operational cost estimate for a NSB independent of the NRC and a discussion on the additional legislative authority required to establish the NSB.

In this study ISO will refer to a generic independent organization for significant event investigation, while ONS will refer to a new organization for significant event (SE) investigation within the NRC, and NSB refers to a NTSB-type separate independent agency for significant event investigation and evaluation for probable cause determination. NSB would be responsible for making recommendations to the NRC to prevent recurrence of such events and improve safety.

2. CURRENT EVENT INVESTIGATION PRACTICES

2.1 NRC Organization

In order to understand how significant event investigations are carried out by the NRC, a brief description of the responsibilities and practices of the involved NRC offices and divisions is presented below. Figure 2.1 depicts the NRC notification process following the occurrence of an event.

The organization chart for the Nuclear Regulatory Commission is given in Table 2.1. This study will focus on the Office of Analysis and Evaluation of Operational Data (AEOD), the Office of Nuclear Reactor Regulation (NRR), the Office of Inspection and Enforcement (IE) and the Regional Offices. In Section 2.5, those aspects of the Office of Nuclear Material Safety and Safeguards (NMSS) which affect this study will be discussed.

The functions of these offices are given in NUREG-0325, Rev. 6. Only those functional objectives of AEOD, NRR, IE, and the Regional Offices that relate to event or incident investigation will be described briefly here.

Overall, the NRC provides support to licensees during and after an incident. After the incident, the NRC will initiate actions to prevent or mitigate continuing hazards to the public and environment.

2.1.1 Office for Analysis and Evaluation of Operational Data (AEOD)

As a result of the TMI-2 accident and the associated studies and investigations, it became clear that improvements were

Figure 2.1

NRC NOTIFICATION PROCESS
FOLLOWING AN EVENT

EVENT

Telephone
Notification

If reportable under 10CFR50.72 telephone notification required: either immediate, 1 hour or 4 hour response based on criteria in 10CFR50.72

Telephone call received at NRC Operations Center, Washington, DC and relayed to Regional Duty Officer, Regional Office

Resident Inspector at Plant assessed situation

Regional Administrator, in conjunction with headquarters, decides scope of response, i.e., I&E, NRR, and Regional involvement. An investigation Task Force may be established. If event is significant, Regional Administrator will go to site to direct NRC activities, and NRC headquarters (Wash.) will direct off-site NRC activities.

Written
Notification

Written LER Report required within 30 days by 10CFR50.73. LER reporting criteria includes all 50.72 criteria plus some additional ones

Bulletins or information notices may be issued by I&E to affected plants or all licensees, to obtain information or provide notice of potential problems

LERs are routinely reviewed for thoroughness, trends, precursors, etc., by Region, I&E, NRR and AEOD

U.S. NUCLEAR REGULATORY COMMISSION

ORGANIZATION CHART

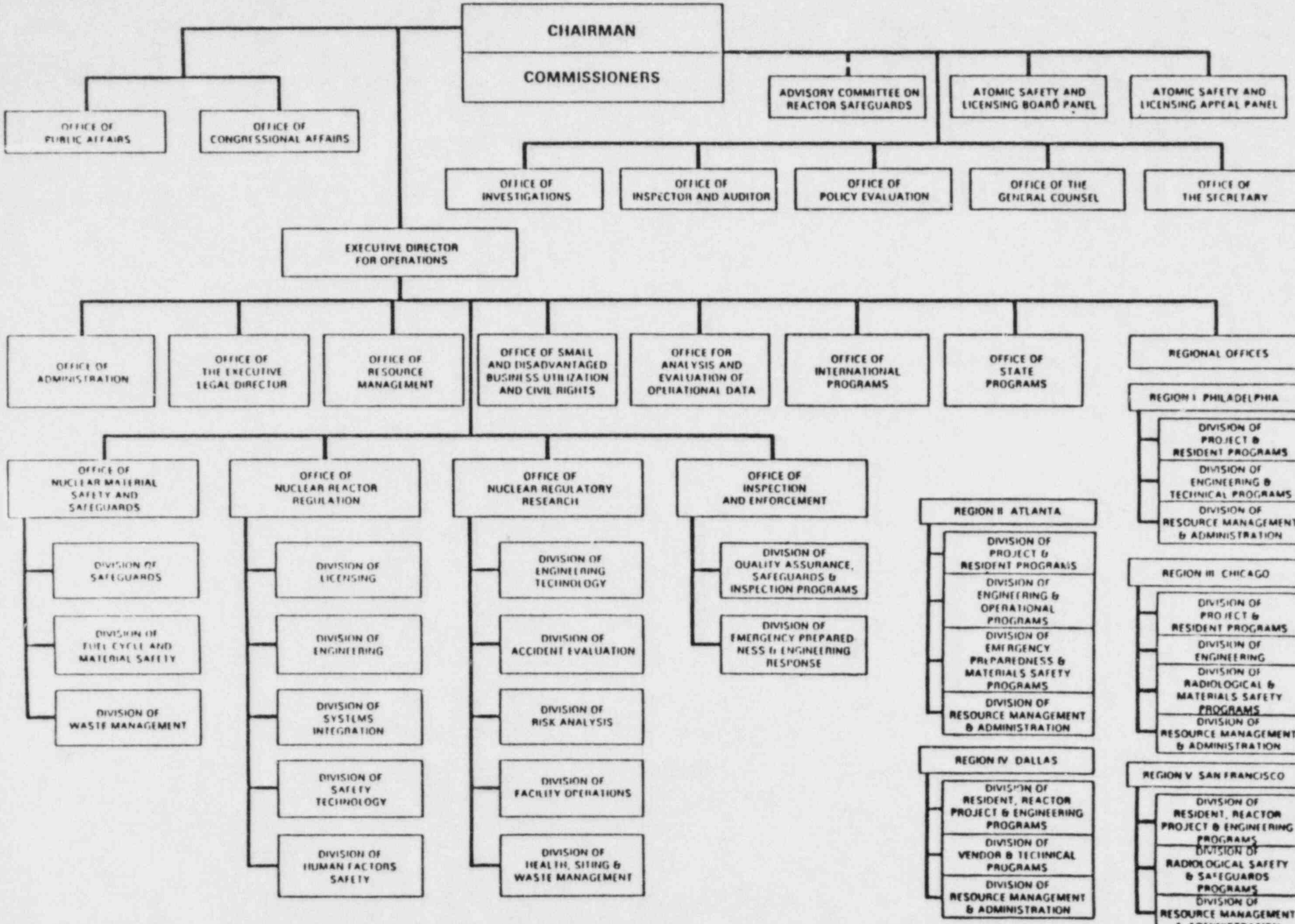


TABLE 2.1

JANUARY 1, 1984
PAGE 1

required in the use of operating experience to help identify and resolve problems which could jeopardize public health and safety.

One of the Commission's early responses to that need was to establish AEOD. This office reports directly to the Executive Director of Operations (EDO). A primary mission of the office is to collect, analyze and evaluate operational safety data associated with all NRC-licensed activities and to disseminate the results. This includes commercial power reactors; and radioactive material and fuel cycle licensees. The office also coordinates the overall NRC operational data program and serves as the focal point for interaction with outside and foreign organizations performing similar work.

The objectives of AEOD are to:

- Collect, screen, analyze, and feed back operating experience to appropriate NRC offices, the nuclear community and the public for all NRC-licensed activities.

- Coordinate the overall NRC operational data program.

- Screen U.S. and foreign operational events for significance.

- Systematically and independently analyze operational events.

- Seek trends and patterns which indicate potential safety problems.

- Develop and track recommendations for action by other NRC offices for resolution of safety issues.

- Develop and coordinate agency guidance on Licensee Event Reports (LERs) and the Nuclear Plant Reliability Data System (NPRDS).

- Develop and coordinate operational data retrieval systems, including foreign data.

- Prepare and coordinate abnormal occurrence reports.
- Prepare Power Reactor Event reports and other feedback documents.
- Provide documentation of U.S. events for reporting to the Nuclear Energy Agency's Incident Reporting System.
- Serve as principal point of contact with ACRS, INPO, and NSAC on operational data activities.

AEOD is part of an overall NRC program to review operating experience in order to identify specific events and generic situations where the margin of safety established through licensing has been degraded, and to identify and implement corrective actions that will restore the originally intended margin of safety. AEOD's focus and involvement in the program are to bring a strong in-house technical capability to bear on the analysis of operating experience independent of regulatory activities associated with licensing, inspection, or enforcement.

AEOD technical studies and evaluations are conducted based upon the screening of U.S. and foreign event reports and on the knowledge and experience of the technical staff. AEOD maintains an awareness of the studies undertaken by others such as NRR, IE, and INPO and, normally, AEOD will not overlap or duplicate the study efforts of other organizations unless a particular need or special circumstance exists.

AEOD study efforts are normally initiated after the licensee report is available (approximately six weeks after the event). Thus, AEOD activities are independent from, and occur later than, the prompt action that may be initiated by the Regional Office, NRR, or IE to investigate an operating event and determine the need for immediate licensee response or generic action.

The recommendations flowing from AEOD studies are not final NRC positions. They are internal recommendations for action by appropriate NRC program offices (e.g., NRR and IE) or Regional Offices. The program office or Regional Office is responsible for reviewing and, where appropriate, implementing AEOD recommendations. A written response to each recommendation is required (by Manual Chapter 0515), and a formal action tracking system has been established. The progress to resolution is monitored, and appropriate action is initiated at the office or EDO level should progress toward resolution be unsatisfactory.

2.1.2 Office of Nuclear Reactor Regulation (NRR)

NRR develops and administers regulations, policies and procedures governing:

- the licensing of manufacturing, production and utilization of facilities other than those concerning fuel, reprocessing plants and isotopic enrichment plants,
- receipt, possession and ownership of source, by-product, and special nuclear material used or produced at such facilities, and
- the licensing of operators of such facilities.

To carry out its responsibilities, NRR must be involved in the investigation and analysis of events to determine their relevance to similar operating reactors. The principal means by which NRR remains current regarding events is through the Operating Reactors Assessment Branch (ORAB) in the Division of Licensing (DL). However, the resources from other technical divisions within NRR (e.g., System Integration, Engineering and Human Factors) are often allocated to supplement the investigation of operating events or to study their generic implications. Whenever such technical division resources are used, the Project Managers are also involved to coordinate the review and provide the interface with licensee.

Operating Reactors Assessment Branch (ORAB)

This branch is concerned with the day-to-day monitoring of events. It screens all events telephoned into the Incidence Response Center or otherwise reported daily. It responds to immediate problems such as assuring the safe condition of the reactor. It tries to identify longer-range problems and coordinates these activities within NRR and with AEOD and IE.

Daily telephone communication with the Events Analysis Branch of IE keeps both NRR and IE informed of each other's activities. The degree of involvement will depend on the implications of the event. If a bulletin (discussed in the next section) is warranted, EAB/IE and the Regional Offices will take the lead. If on the other hand, a licensing action is required or a generic issue is at stake, NRR will take the lead. AEOD and other NRR offices will be integrated into the process by means of biweekly meetings held to discuss and assign priorities for the investigation of events. AEOD is free to review any event *ad hoc* which it feels may involve long-term precursors.

ORAB/DL also provide interdisciplinary technical support to operating reactor projects in the processing of relatively routine short-term licensing actions. It performs technical reviews in support of emergency licensing, provides rapid initial evaluation of unanticipated events, and defines needed support from other NRR divisions. It performs continuing systematic assessment of operating reactor experience, identifies precursors, performs analyses of other significant events and acts as a focal point for responding to Regional requests. It also acts as a Project Coordinator for specially assigned generic functions which encompass several divisions and offices.

2.1.3 Office of Inspection and Enforcement (IE)

IE develops policies and programs for enforcement and inspection of licensees, applicants, their contractors and suppliers to ascertain whether they are complying with NRC regulations, rules, and license conditions. IE also recommends or takes appropriate action regarding incidents or accidents. These actions are prescribed in the form of Inspection and Enforcement Bulletins (IEBs) and Information Notices (INs) defined as follows:

Bulletin. A bulletin may be issued:

- to ensure that appropriate actions are taken by other plants to minimize the probability of recurrence of an event at those plants;
- to request information to determine the need for further actions to prevent a similar event;
- in response to an event after it has been determined to be significant;
- when a licensee response is required.

Information Notice. An information notice may be issued when:

- The event or condition may be important to safety, safeguards, or protection of the environment, and information is available indicating that the problem may be generic in nature.
- Based on the information available at the time, the event or condition does not meet the criteria for issuance of a Bulletin; however, licensees or permit holders should be promptly notified.
- Information on the event or condition is preliminary in nature (essentially unevaluated by the NRC) and when more facts are known, a Bulletin may be issued.

All Bulletins and Information Notices are issued by the Office of Inspection and Enforcement as specified in Chapter 1125 of the I&E Manual.

The IE Office Director approves and signs all bulletins following staff review, industry comment when applicable, and review by the Committee for the Review of Generic Requirements (CRGR). The IE Office Director also approves the issuance of bulletins as an emergency action that is needed to protect the health and safety of the public. In this case, CRGR review is not necessary and emergency clearance pre-approved by the Office of Management and Budget (OMB) is invoked.

In the case of an Information Notice, the Director, Division of Emergency Preparedness and Engineering in IE is designated as the coordinator. He or she is also the coordinator for all IE bulletins.

Any organization within NRC (e.g., IE, Regional Offices, AEOD, etc.) may recommend the issuance of an IEB or an IN. Recommendations may also originate from AEOD, NRR or NMSS. Their recommendations are forwarded to the appropriate IE Division Director according to prescribed procedures set forth in Section 1125-12 of the IE Manual.

<u>Orders</u>

An order can be issued to impose new requirements on the licensee or require the licensee to take specific actions. The order is binding and requires immediate compliance with the risk of license revocation or suspension for failure to comply.

The Commission, Directors of IE, NMSS, or NRR and in rare cases the Regional Administrator, can issue an order.

The guidelines under which an order can be issued are delineated in 10CFR2.202 and 10CFR2.204.

Events Analysis Branch of IE (EAB)

This branch is responsible for the analysis of events in order to identify generic problems requiring a quick response. It does the initial review of 50.72 reports (calls), construction reports, vendor reports, etc. Its actions are usually based on telephone communications. It looks at each event and decides whether it represents a generic problem requiring a fairly prompt recommendation. This judgment is usually made in no more than a day or two; AEOD considers longer range responses. The Regional NRC Office is responsible for maintaining safety at the plant.

The Branch also mans the Operations Center (also called the Incident Response Center) 24 hours per day. The person on duty at the Center evaluates the calls, enters them into the computer and decides whether they need immediate attention or action. Although the real-time safety of the particular plant involved in an event takes precedence over other considerations, a fundamental purpose of the conference calls is to assign responsibility for follow-on actions required to determine the cause of potentially significant events and the need for generic actions in other plants. The person on duty receiving calls at the Center calls the Regional Duty Officer for the appropriate Region, and for other than emergency responses, the Regional Duty Officer decides if immediate action is required. The computer printout of calls to the Operations Center is available at a number of additional locations including AEOD and INPO. This printout is obtained by direct access to the computer by the interested parties.

10CFR50.72, which was revised effective January 1, 1984, defines the events for which calls to the NRC Operations Center are required. The criteria in 50.72 are essentially the same as the criteria in 50.73 for Licensee Event Reports (LERs) so that with few exceptions, significant events that are reported to the Operations Center are subsequently described in LERs. There should be no case where a significant operating event which was reported in an LER was not also reported by phone to the Operations Center.

EAB interfaces with other branches in IE and NRR and frequently with other organizations before making a recommendation on issuance of an Information Notice, Bulletin, or other response.

2.1.4 Regional Offices

The Resident Inspector provides the major on-site NRC presence for direct observation and verification of licensee activities. The Resident Inspectors are also the primary on-site evaluators for the NRC inspection effort stemming from LERs, events or incidents (I&E Enforcement Manual 2515-06). It is expected that the greater part of the initial event-related inspection will be performed by the Resident Inspectors (who may be supplemented by other inspectors, depending on the type of event). Therefore, in principle, the initial investigation of any event begins at the Regional Offices with the Resident Inspector. The Regional Administrator is then supposed to determine the severity of the event and initiate coordination within the Regional Office and NRC Headquarters through the Director, Office of Inspection and Enforcement.

The Regional Office is the coordinator for interaction between the utility and the NRC. The Regional Administrator can advise the utility whether it can start up after an event and, in most cases, the utility will volunteer to wait for guidance from the NRC. The power to recommend restart of a plant after a significant event seems to rest jointly with NRR and the Regional Administrator.

It should be noted that the regions also have Incident Response Centers equipped with communications and dose assessment hardware. The regions maintain duty officers to ensure timely identification and response capabilities.

2.2 Event or Incident Definition

The categorization of events or incidents which must be reported by the licensee to the NRC is given in 10 CFR 50.72. There are five classes of events, as shown in Table 2.2, that require notification, namely, Unusual Events, Alerts, Site Area Emergencies, General Emergencies and Non-Emergencies.

2.2.1 Emergency Class of Events

Basis for Emergency Action Levels for Nuclear Power Facilities

Four classes of Emergency Action Levels have been established, which replace the classes in Regulatory Guide 1.108, each with associated examples of initiating conditions. The classes are:

Unusual Event
Alert
Site Area Emergency
General Emergency

The rationale for the notification and alert classes is to provide early and prompt notification of minor events which could lead to more serious consequences, given operator error or equipment failure, or which might be indicative of more serious conditions which are not yet fully realized. A gradation is provided to assure fuller response preparations for more serious indicators. The site area emergency class reflects conditions in which some significant releases are likely or are occurring, but where a core melt situation is not indicated by current information. In this situation full mobilization of emergency personnel in the near site environs is indicated, as well as dispatch of monitoring teams and associated communications. The general emergency class involves actual or imminent substantial core degradation or melting with the potential for loss of containment. The immediate action for this class is sheltering (staying inside) rather than evacuation until an assessment can be made that 1) an evacuation is indicated, and 2) an evacuation, if indicated, can be completed prior to significant release and transport of radioactive material to the affected areas.

The example initiating conditions listed after the immediate actions for each class are to form the basis for establishment by each licensee of the specific plant instrumentation readings (as applicable) which, if exceeded, will initiate the emergency class.

Potential NRC actions during various emergency classes are given in Chapter NRC-0502, NRC Incident Response Plan. The NRC response to any notification from a licensee will be related to, but not limited by, the licensee estimate of severity. NRC will consider such other factors as the degree of uncertainty and the lead times required to position NRC response personnel should something more serious develop.

Prompt notification of off-site authorities is required within 15 minutes for the unusual event class and sooner (consistent with the need for emergency action) for other classes. The time is measured from the time at which operators recognize that events have occurred which make declaration of an emergency class appropriate.

The four classes are summarized in Table 2.2.

The number of events requiring notification of an unusual event was 205 in 1983, of which 7 required an Alert Status.

2.2.2 Non-Emergency Events

These events are divided into two classes, namely, those requiring notification within one hour and those which must be reported within four hours.

One hour reports are required for any event or condition that causes:

- plant shutdown required by the Technical Specifications;
- any event that seriously degrades the power plant, including its safety barriers;
- any natural phenomenon or other external condition that poses a threat to the safety of the plant;
- any event that activates or should have activated the Emergency Core Cooling System (ECCS);
- any event that compromises the emergency response capability;
- any event that poses an actual threat to the safety of the plant or could impede site personnel from performing their designated tasks.

Table 2.2

Emergency Class of Events

CLASS	CLASS DESCRIPTION
NOTIFICATION OF UNUSUAL EVENT	Unusual events are in process or have occurred which indicate a potential degradation of the level of safety of the plant. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.
ALERT	Events are in process or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant. Any releases expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.
SITE AREA EMERGENCY	Events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public. Any releases not expected to exceed EPA Protective Action Guideline exposure levels except near site boundary.
GENERAL EMERGENCY	Events are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

Four hour reports are required for the following:

- any event found in the shutdown which, had the reactor been at power, would have required a one-hour notification;
- any event that required activation of the Engineering Safety Features (ESF) or the Reactor Protection System (RPS);
- any event that would have impaired the safety functions or structures needed to bring the plant to a safe shutdown;
- any event that results in emissions exceeding two times the limit.

More detailed requirements are given in 50.72.

2.2.3 Abnormal Occurrences

An abnormal occurrence is defined as an unscheduled incident or event which the Commission determines is significant from the standpoint of public health or safety and which is reported to Congress. A potential abnormal occurrence is any event which is identified for possible reporting by the staff as an abnormal occurrence.

The procedures, responsibilities and authorities for handling and reporting an abnormal occurrence are specified in Chapter 0212 of the NRC Manual.

AEOD prepares the quarterly AO Report to Congress as well as the Federal Register Notices, and after coordination, forwards them to Congress via the Office of Congressional Affairs. These reports serve as a feedback of significant event information to government agencies, licensees, and the public. The reports are widely distributed and are available individually or on a subscription basis by the NRC GPO sales program.

The NRC Manual Chapter 0212 (Abnormal Occurrence Reporting Procedure) has recently been revised by AEOD in coordination with other NRC offices and was forwarded to the Office of Resource Management for approval and distribution in June 1984. This revision updates this chapter with regard to organizational responsibilities (last revision was in 1978) and adds a comprehensive appendix to provide guidance for the selection and processing of potential events to be labeled an Abnormal Occurrence.

Thirteen AOs in NRC-licensed activities and one AO from an Agreement State were reported to the public and Congress for the January 1 to June 30, 1984 period. Of these fourteen AOs, five occurred at nuclear power plants and nine occurred at other licensees (e.g., industrial radiographers, medical institutions).

Four additional events were identified as possible AOs and forwarded for Commission approval. These events were subsequently approved by the Commission and were published in the Federal Register.

2.2.4 Licensee Event Reports (LERs)

10 CFR 50.73 states that the holder of an operating license for a nuclear power plant (licensee) shall submit a Licensee Event Report (LER) for any event described below within 30 days after the discovery of the event. The events to be reported are:

1a) The completion of any nuclear plant shutdown required by the plant's Technical Specifications (TS), or

1b) any operation or conditions prohibited by the plant's TS, or

1c) any deviation from the plant's TS authorized pursuant to 50.54(x) of this part.

2) Any event or conditions that resulted in the condition of the nuclear power plant, including its principal safety barriers, being seriously degraded or that resulted in the nuclear power plant being

   a) in an unanalyzed condition that significantly compromised plant safety,

   b) in a condition that was outside the design basis of the plant, or

   c) in a condition not covered by the plant's operating and emergency procedures.

3) Any natural phenomenon or external condition that posed an actual threat to the safety of the plant or hampered site personnel.

4) Any condition that activated any of the Engineered Safety Features (ESFs) including the Reactor Protection System (RPS) (not including planned tests of these systems).

5) Any event or condition that alone could have prevented the fulfillment of the safety function of structures or systems needed to shut down the reactor and maintain it in a safe condition, remove residual heat, control the release of radioactive material or mitigate the consequences of an accident.

6) Any event in which a single cause or condition caused at least one independent train or channel to become inoperable in multiple systems, or two independent trains or channels to become inoperable in a single channel, designed to shut down the reactor and maintain it in a safety condition, remove residual heat, control the release of radioactive material or mitigate the consequences of an accident.

7) Any event that involves the release of airborne or liquid effluent that exceeds twice the maximum applicable concentrations.

8) Any event that posed an actual threat to the safety of the nuclear power plant or significantly hampered site personnel in the performance of duties necessary for the safe operation of the nuclear power plant, including fires, toxic gas releases, or radioactive releases.

The contents and format for filling out the LERs are described in detail in 10CFR50.73.

In 1983 (i.e., prior to 50.73), there were approximately 4500 LERs, while in 1984 (i.e., after 50.73 became effective), approximately 2200 LERs are expected. Of the 1105 LERs reported for the first half of 1984 (January 1 to June 30), 70 were considered significant by AEOD to receive further study. These events are categorized on the basis of an AEOD screening process to identify and isolate precursor events and other situations where the margin of safety has been degraded, and to identify from the operational experience data, situations or concerns of a generic nature which may have potential safety significance. A precursor is considered to be an event that could have been potentially serious if plant conditions, personnel actions, or the extent of equipment failure had been slightly different.

2.2.5 Summary of Events 1983 and 1984

The number of events reported at U.S. commercial reactors in 1983 and 1984 was as follows:

Type of Event	1983	1984
Emergency:		
Unusual Occurrence	205	224
Alert	7	8
Non-Emergency:		
LERs	4500	2200
Abnormal Occurrences	8	8

2.3 Investigation Procedures and Deficiencies

The preceding sections outlined the areas of specific responsibilities for each of the offices at NRC, including the Regions, with regard to event or incident investigation and follow-up. The consensus of the BNL Task Force conducting this study is that there appears to be some overlap of duties. It was also the Task Force's understanding that the NRC office responsible for conducting the investigation of an event is occasionally decided on an ad hoc basis. For example, from talking to the Regional Administrators, it appears that the Region has the lead role in screening telephone reports and LERs for significant events. NRR, Division of Licensing, is expected to provide technical support not available at the region and determine whether an immediate generic licensing or safety issue exists. However, if we look at the role of the Events Analysis Branch (EAB) in the Division of Emergency Preparedness and Engineering Response in IE, and the Operating Reactors Assessment Branch (ORAB) in the Division of Licensing at NRR, we see that both branches are screening callins and LERs, albeit from different points of view and interest -- EAB to determine whether immediate action is required by IE, and ORAB to determine whether immediate action is required with respect to licensing. AEOD along with these two branches is also screening the LERs, but with the objective of identifying potential long-term trends or generic issues.

From discussions with representatives of AEOD, IE and NRR, there appears to be coordination between them and the Regions. For example, ORAB/NRR and EAB/IE have telephone meetings every morning to discuss the reported events of the previous day. One periodic follow-on meeting is held bi-weekly with AEOD to keep the Director of NRR current on what significant events ORAB and EAB may be following. The Division Directors of NRR meet periodically with AEOD and IE to discuss events that the staff have assessed as significant and assign priorities according to risk and allocate resources for further study. The Regional Office is the primary contact with the utility and is usually the coordinator for ongoing fact finding investigations. However, it is clear that unless a specific Task Force is organized, any of the NRC offices can send staff to the site. Also, the level of attention paid to any event is influenced a great deal by the interests of the individual branches and/or offices. There appears to be a need for a clearly defined mechanism by which one office always takes the lead, at least on those events that have been screened to be significant and for which a fact-finding investigation is warranted.

2.4 INPO and EPRI/NSAC Practices

The Institute of Nuclear Power Operations (INPO) and the Nuclear Safety Analysis Center (NSAC) are organizations which have come into being following the Three Mile Island-Unit 2 event in 1979. They both represent endeavors by electric utilities to provide an increased awareness and responsiveness to the need for improved safety at nuclear power plants.

2.4.1 Organization

In the wake of the Three Mile Island-Unit 2 (TMI-2) accident in March 1979, the nuclear industry formed two separate, but non-independent entities. The first to be founded (in April 1979) was the Nuclear Safety Analysis Center (NSAC), which is housed at the Electric Power Research Institute (EPRI) headquarters in Palo Alto, California. The second organization, designated the Institute of Nuclear Power Operations (INPO), was founded in December 1979 and is located in Atlanta, Georgia.

In the ensuing five years since TMI-2, these two organizations have undergone continual change. There was much overlap initially between INPO and NSAC, as their specific goals and objectives were being defined and refined. However, these differences and overlaps have now been resolved for the most part, with the result being two well-run, efficient, and smoothly intermeshing entities. As a result of this five year evolution, INPO has emerged with the dominant role, while NSAC has assumed a supporting role.

NSAC's original mission in 1979 was to carry out a detailed technical analysis of the events during the TMI-2 accident, and to interpret the lessons to be learned from them. Further, it was to develop strategies to minimize the possibility of a future accident, and to address generic questions of reactor safety. Finally, NSAC was to act as a clearing house for technical information on safety issues that emerged following the accident, and make recommendations on changes in safety systems or modifications of operating procedures that would further improve safety.

More intensive activity went into the effort to define the scope of operation and the structure of INPO. It was created to force the utilities to achieve greater levels of safety, productivity, and reliability. These goals are accomplished by varied activities which include:

- Establishment of operations standards and industry evaluations of operations.
- Gathering of operational information and industry-wide dissemination of it.
- Accreditation of nuclear operator training programs.

- Improvement of emergency response capabilities.
- Involvement of utility management in nuclear power plant operations.

INPO was structured to ensure a variety of input to its activities. An 11-member board of directors was created, composed of executives (currently including nine chief executive officers) from member utilities, two of whom are required to have had recent operational experience. There is also an advisory council of 18 experts, from outside the utility industry, but related to INPO's mission. In addition, each of INPO's five operating divisions is advised by an Industry Review Group of, typically, nine persons.

In 1981, a realignment of functions between NSAC and INPO was agreed to. Functions were moved to INPO so as to consolidate those activities which are most clearly related to day-to-day plant operations and to add to the technical strength of INPO. Studies of postulated and low-probability events and investigation of generic safety matters were placed at NSAC. Thus, NSAC began to focus on the lower-probability but higher-consequence issues, and INPO was given the responsibility for work on problems of a direct operating nature. Since there are interfaces between NSAC and INPO, coordination meetings between staff of both organizations are held to identify areas of mutual concern and see that they are appropriately covered. Responsibility to coordinate specific areas has been assigned to personnel in each organization.

There are 376 people currently at INPO. Many of these have had plant operations experience. Currently, 53 of these people are on loan (for periods of 1-2 years) from utilities and vendors. These "loanees" provide INPO not only with additional expertise, but also with a more day-to-day link to the nuclear industry. Recently, INPO has initiated a "reverse loanee" program, sending some of its staffers to work for utilities, to provide professional development opportunities for people that need additional plant or utility experience.

All 55 domestic utilities that are operating or building nuclear power plants are INPO members, and numerous supplier participants (such as vendors and architect-engineers) and international participants (foreign utility organizations) provide a wider perspective. INPO follows commercial nuclear power plants through their entire lifetime (i.e., from construction to decommissioning).

INPO has entered into a written contract with each domestic utility. By doing so, the utility commits itself to maintaining certain standards of operation. These performance objectives and criteria are developed by INPO, but can be changed or modified through time with industry input. By maintaining these standards a utility obtains INPO "approval". Lack of this approval can increase the utility's insurance fees. Furthermore, INPO's approval can be suspended if necessary (e.g., if the utility does not meet the terms of the contract, or does not conform to certain recommendations or follow-on suggestions for improving performance made to it by INPO). This is a major reason why INPO obtains good cooperation from the utilities.

2.4.2 INPO and NSAC Reporting System

To accomplish their goals, much usage is drawn from experience. INPO and NSAC have instituted a systematic gathering, review, and analysis of operating experience at all nuclear power plants coupled with an industry-wide international communications network to facilitate the speedy flow of this information to affected parties. This is addressed by a system called SEE-IN

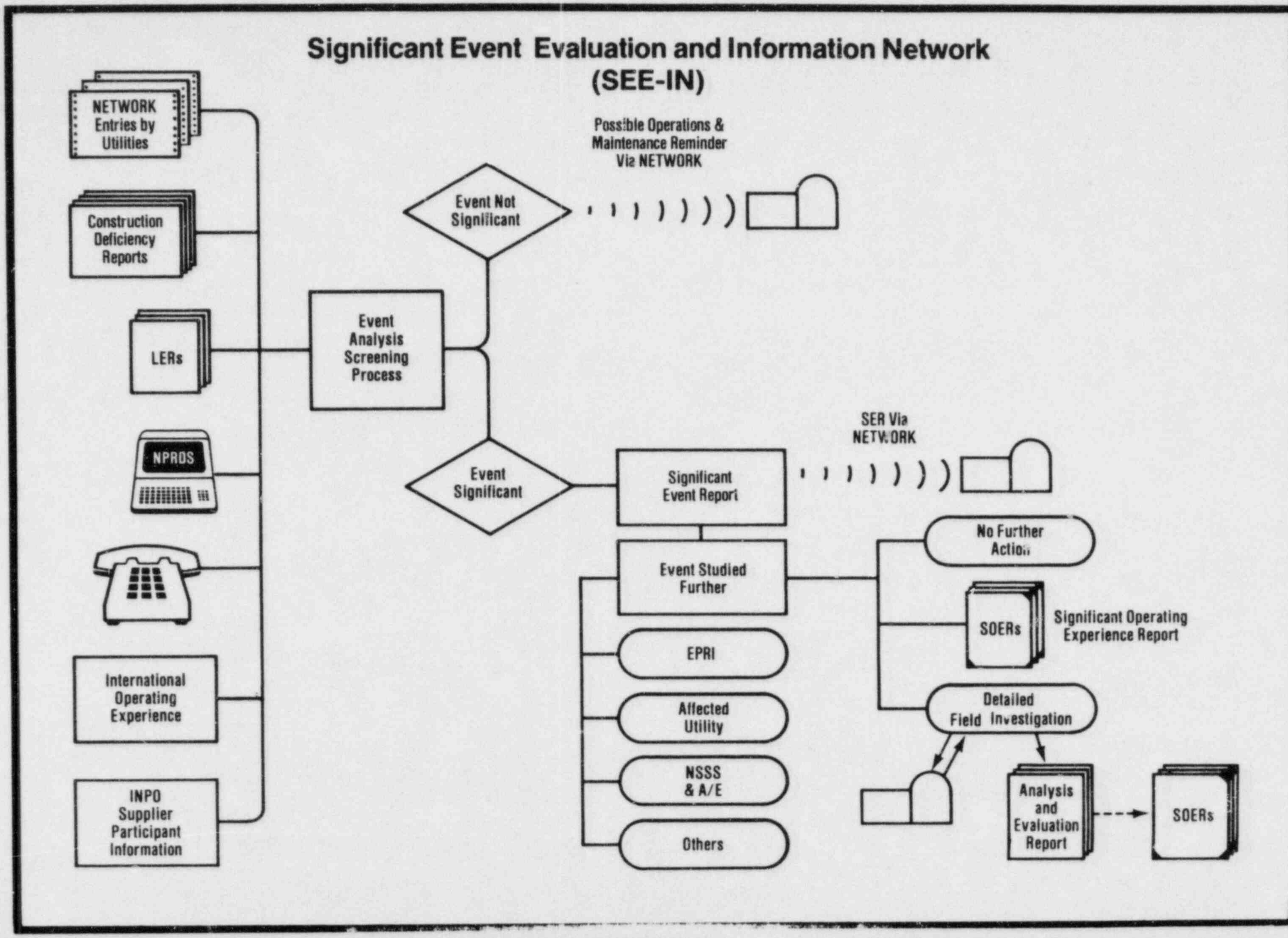
(Significant Event Evaluation and Information Network), which is basically an events analysis program. The SEE-IN system began operation in early 1980 with INPO and NSAC cooperating in its administration. Since January 1982, it has been administered and funded solely by INPO.

The communications network, controlled by INPO, is now known as Nuclear Network. This system allows extremely rapid transmittal of information via computer to world-wide communication links. Another INPO activity that relates to these is NPRDS (Nuclear Plant Reliability Data System). Inputs to the SEE-IN program include NRC-mandated Licensee Event Reports (LERs) and other information from utilities, and data from vendors and industry organizations, and NPRDS (see Figure 2.4.1). Of the 10,019 SEE-IN program inputs in 1983, 6,435 were LERs, 3,120 were operating experience reports (included here are international reports 10 CFR 21 failure reports, construction deficiency reports, as well as vendor, utility and A/E reports) and 464 came in via the NPRDS.

Nuclear Network

Nuclear Network has links via a worldwide computerized teleconferencing network, and serves as an electronic bulletin board and several other functions. It connnects U.S. nuclear utilities, nuclear steam supply system vendors, architect-engineers, overseas utility organizations, other engineering organizations both foreign and domestic, EEI, AIF, and NSAC (which had sponsored the system's original predecessor, Notepad, back in 1979). The system allows a user to ask for information simultaneously from all other users or from specific users, respond to questions from others, and to call up information on numerous topics. In addition, Nuclear Network is used to transmit Significant Event

Figure 2.4.1



Significant Event Evaluation and Information Network
(SEE-IN)
NETWORK Entries by Utilities
Construction Deficiency Reports
LERs
NPRDS
International Operating Experience
INPO Supplier Participant Information
Event Analysis Screening Process
Event Not Significant
Possible Operations & Maintenance Reminder Via NETWORK
Event Significant
Significant Event Report
SER Via NETWORK
Event Studied Further
EPRI
Affected Utility
NSSS & A/E
Others
No Further Action
SOERs
Significant Operating Experience Report
Detailed Field Investigation
Analysis and Evaluation Report
SOERs

Reports (SERs, described later) and Operations & Maintenance Reminders (O&MRs) generated by the SEE-IN program. To provide information during an emergency at a plant, the system can send messages to the whole industry simultaneously, thus limiting utility and supplier inquiries.

Nuclear Plant Reliability Data System

NPRDS collects two types of information on selected nuclear plant systems and components: 1) engineering data and normal operating characteristics, and 2) failure descriptions. These are maintained in a computer data base at INPO. The operating experience data, for example, are useful for analyzing failure rates, supporting maintenance activities, determining spare parts levels, designing equipment, and other applications. NPRDS now has an interactive data entry capability to input information directly through computer terminals.

Technical Reports

The products of INPO's and NSAC's work, its findings, are published in a series of technical reports and distributed to the industry and NRC. The two major products are Significant Event Reports (SERs) and Significant Operating Experience Reports (SOERs). Basically, an SER is a brief technical description of an event (similar to an LER), while an SOER is much more comprehensive, and contains analyses, conclusions and generic recommendations. Given the evolution of INPO's and NSAC's responsibilities, INPO has the lead in this type of reporting. NSAC plays a supportive role and is called upon by INPO on a case by case basis. NSAC will provide further evaluation capability (usually involving sophisticated computer codes), when requested. In general, NSAC supplies assistance to INPO in the evaluation of major significant events. This normally involves a plant visit and preparation of an in-depth report.

As mentioned previously, INPO draws information from a variety of sources (see Figure 2.4.1). Existing reporting systems are used. INPO learns of the occurrence of any event usually within 24 hours, 48 at the latest. INPO screens about 10,000 inputs per year. The majority come via the normal LERs, which are also transmitted to the NRC. INPO carefully screens all events and then classifies each as either significant or not significant. INPO claims that 98% of what it looks at is not significant. A non-significant event can provide the basis for an Operations & Maintenance Reminder, which usually will take the form of an informative note to participating parties regarding very specific details of component performance or maintenance that may be of interest.

If the event is significant, an SER is written. At that time, action beyond the initial report is initiated, which is ultimately headed, if judged applicable, toward an SOER. This means further analysis and, finally, recommendations. As mentioned before, an SER is a brief technical description of an event, while the SOER contains analyses, conclusions and generic recommendations. Typically, INPO generates 80-100 SERs and 5-15 SOERs per year. For example, 87 SERs and 9 SOERs containing 107 recommendations were issued in 1983. In addition, INPO produces an average of one analysis and evaluation report a year, which involves a detailed on-site field investigation focusing closely on "a major event". NSAC will typically assist INPO in this investigation and evaluation, as well as provide comments on SERs. An SER can be produced within one week, if urgent. It normally takes about 4-1/2 months to get out an SOER.

Concerning the availability or accessibility of INPO's reports (particularly SERs and SOERs), anything having "significance to safety" is released to the NRC, eventually. The NRC has not yet received all INPO generated SERs. Prior to release to the utilities or to the NRC, SERs and SOERs are submitted to the staff of the utility at which the incident occurred to obtain a technical review for accuracy. INPO claims this is not requesting approval as such. Sometimes, in addition to the utility, a vendor (or vendors) are involved. Sometimes there are comments to be integrated, and this is sometimes difficult. INPO stated that only comments and not concurrence is needed before the report can be released to member organizations. However, concurrence by the affected utility or vendor(s) is needed before release to the NRC. This process can cause some reports to be delayed before release, but it is not viewed by INPO as overly restrictive.

Normally, plant-specific evaluation reports are not sent to the NRC. As a general rule, INPO will not release to the NRC those things of non-safety significance that the utilities themselves wouldn't release. However, if the information is deemed to have significance to safety, it will release it (after utility approval).

Inputs to INPO's Nuclear Network are not available to the NRC or to members of the public. Further, INPO technical reports (e.g., SERs, SOERs and O&MRs) are available to the industry, and generally available to the NRC, but are not available to the public. INPO maintains that its reports are proprietary and will send the information to the NRC only if the documents are not released publicly.

2.4.3 Incident Investigation and Analysis of Significant Events

INPO maintains what it refers to as an Emergency Response Center (ERC). The function of the INPO ERC is similar to that of the NRC Incident Response Center (IRC). In the INPO agreement, which it has with each utility, is the understanding that the utility will alert INPO for any event which requires notification to the NRC IRC. While the INPO ERC is not manned 24 hours a day, around-the-clock duty officers are assigned who respond immediately to the ERC upon notification. During any significant incident at a power plant, the ERC staff will then be assembled quickly to follow the accident. The ERC also serves as the focal point for the rapid dissemination of incident-related information to the whole nuclear industry via INPO's communications system (i.e., Nuclear Network).

During and immediately after a significant event, INPO and NSAC follow a self-imposed rule and do not visit the plant. They attempt to keep out of the way of the NRC. They will wait a while (sometimes 3-4 weeks) before visiting the plant. By then they usually have received the NRC reports.

INPO would like to get in to an incident scene much earlier than it now does (e.g., within 24 hours). They say that the situation needs to be "frozen". Specifically, the operators should not leave until they have been debriefed fully. Otherwise, if much time elapses before plant staff can be interviewed, "myths" will have been established about what happened, making it much more difficult to get the true picture. INPO has direct access to the utility personnel, and strives to maintain good relations. It claims that its people are not in an adversarial relationship with them, as the NRC staff is.

To produce an SOER, at least one plant visit and further analysis are involved. It is in this significant event area that NSAC has its most important interface with INPO. NSAC provides further analysis of unusual plant events, selected by INPO. It also participates in field investigations and in-depth evaluations of major plant events.

Examples of such events are:

- Crystal River Unit 3, where NSAC provided a RETRAN analysis; and,
- Ginna plant steam generator tube rupture where NSAC participated with INPO in a thorough review of this highly publicized incident. Two SOERs were written, which contained 25 follow-on items.

These end products, the SOERs, are complete with recommendations and specific guidelines for the plants to implement the recommendations. These recommendations form the basis for an evaluation and inspection by INPO of individual plants.

Operating plants are evaluated using published performance objectives and criteria, which are developed and further changed through time with industry input. One of the major ingredients in these evaluations are the recommendations produced by the SOER effort. INPO conducts about 50 evaluations/year. Each plant has a "scorecard" given it by the inspection team. If a plant is not doing well in implementing the recommendations, follow-up teams are dispatched to remind the operator of his obligations. In the end, if the plant does not make improvements, its INPO approval can be suspended, meaning an economic penalty to the utility (see Section 2.4.1).

2.5 Non-Operational NPP and Other NRC-Licensed Facility Events

Whereas Section 2.1 of this chapter addressed the NRC practice in incident response for licensed nuclear power plants, this section will briefly focus on the role of the NRC in the response to the uncontrolled release of or exposure from non-reactor byproduct, source, or special nuclear material and security issues. The objective of this section is not to present the full details of the applicable NRC procedures, but instead to introduce the reader to the typical responses of the organization to unusual events.

In addition to the responsibilities in the area of power reactor safety which is the principal subject for this study, the NRC has jurisdiction over power reactor security and licensed nuclear material. This includes the processing, transportation, handling, storage, and disposal of licensed nuclear material in fuel cycle facilities, non-DOE research reactors, industrial radiography, and nuclear byproduct medicine. The NRC staff, specifically the Office of Nuclear Material Safety and Safeguards, regulates the industry to protect the public's health and safety and to assure the national security. The latter is accomplished through the regulation of strategic quantities of special nuclear material that fall under 10 CFR Parts 70 and 73. As can be seen, investigation and determination of probable causes in these areas could play a major role on the control of both individual and societal risk. This is illustrated by AEOD's semi-annual report for January-June 1984 in which over 1000 events of "medical misadministration" are reported to have occurred since late 1980. Approximately 500 radiation exposure events per year are reported, which include overexposure from industrial accidents and medical misadministration. Depending on the exposure level and the number of individuals affected, the total accumulated individual or societal risk could be substantial. The following paragraphs describe the authors' interpretation of how an investigation takes place.

The Headquarters responsibility for managing and coordinating an incident involving nuclear materials that falls below the threshold of NRC Manual Chapter-0502 rests with the Office of Nuclear Material Safety and Safeguards (NMSS). NMSS provides the necessary guidance and technical support and coordinates the NRC response. After the initial report of the incident which most often originates with the Regions or Inspection and Enforcement (I&E), NMSS becomes the point of contact and processes further information within the NRC. NMSS also maintains the records of the NRC response and provides periodic updates for other offices and the Executive Director of Operations (EDO). I&E is responsible for transmitting to NMSS initial reports of incidents received through the NRC Operations Center. The Regions report those which are received through their responsible areas and which they decide are of a significance warranting notification. I&E then cooperates with NMSS on the investigation. In some cases NMSS has delegated some of its response authority to the appropriate region. These levels of responsibility are in part described in "Modified Interim Plan for NRC Response to Materials Contamination Incidents," a note to B. Grimes from R. Page dated September 20, 1984, and the NRC Manual Chapter 0212. Additional information contained in this paragraph was obtained through personal interviews with cognizant NRC representatives.

In those cases in which attempted theft, sabotage, or tampering are suspected, or in transportation accidents, NMSS coordinates with other appropriate Federal agencies, the Federal Bureau of Investigation (FBI), or the Department of Transportation (DOT). If the FBI becomes involved, NMSS' investigation is limited to the review of the apparent failure of the safeguards system. If the incident has international ramifications, then the Office of International Programs (IP) is designated to lead the NRC investigation.

The first judgment as to an event's severity is performed by the Region or Headquarters that first receives the reports. In addition, all threats are reviewed by the Information Assessment Team (IAT), which includes representatives from all NRC program offices, to determine the need to initiate the Incident Response Center.

NMSS staff members in all three divisions, Safeguard, Fuel Cycle and Material Safety, and Waste Management, review licensee operational event data in accordance with prescribed procedures in order to identify problems, significant trends, and patterns. However, according to interviews with the NRC staff, its efforts are concentrated on physical security issues and not on all classes of non-power plant events. Staff interviewees felt that this is the area of highest potential societal risk. It should, however, be noted that this conclusion was apparently not based on a comparative individual risk analysis. NMSS also maintains a Safeguards Event List (SSEL) that provides summaries of related nuclear materials or facilities events. The total number of safeguard events recorded for the period of January 1980 to December 1983 was 420. These are sub-divided into nine categories:

Categories	Number of Events in Above Time Frame
• Bomb threats	191
• Intrusions	19
• Missing and/or allegedly stolen material	74
• Transportation related events	27[1]
• Vandalism	35
• Arson	10
• Firearms-related events	22
• Sabotage	0
• Miscellaneous	68

[1]Of the 27 transportation related events, 26 have also been accounted for under other topic areas.

For a statistical analysis of all reported events from 1976 through 1983, reference Appendix A of NUREG/0525, Rev. 9, "Safeguards, Summary Event List." If a safeguards event on the SSEL is considered to meet the definition of an abnormal occurrence, reference NRC Manual Chapter 0212, it is also reported under the abnormal occurrence procedures.

The Office for Analysis and Evaluation of Operational Data (AEOD) uses its non-reactor assessment staff to also review, analyze, and evaluate data from licensed nuclear fuels and radioactive materials facilities. The NMSS staff also independently reviews, analyzes, and evaluates licensee operational data and provides support to the AEOD activity as needed (see NRC Manual Chapter 0515, Section 037).

As noted earlier, this report has concentrated by definition on the power reactor operational safety issue, and how the investigation of an event could be optimized. This, however, should not be interpreted as placing less importance on the investigation of non-operational and non-power reactor events since a comparative risk review was outside of the study's scope. Conclusions concerning investigation of power reactor events can, in general, apply also to the other cases within the NRC responsibility.

2.6 Examples of Significant Event Investigations

2.6.1 Introduction

While approximately 2-3 thousand licensee events are reported each year, most of these events have only minor significance and require minimal NRC evaluation. However, each year approximately 10-20 events, of which about 8 events are from nuclear power plants, are reported to Congress as Abnormal Occurrences.

In order to further describe the NRC incident investigation procedures and practices, the NRC investigations of several recent events which were subsequently described as Abnormal Occurrences are summarized in this section. The events described include; 1) the nuclear accident at Three Mile Island, 2) the failure of the automatic trip system at Salem-1, 3) the improper control rod manipulation at Quad Cities-1, 4) the failure of the control rods to fully insert during a scram at Brown's Ferry-3, 5) the uncontrolled leakage outside of primary containment at Hatch-2, and 6) the overexposure of workers' hands at Nuclear Metals, Inc. The selected events include a wide range in severity (from TMI to the exposure of workers' hands) and span the period since TMI. These events were all reported to Congress as Abnormal Occurrences and involve investigations by the Offices of AEOD, I&E, NMSS and/or NRR.

2.6.2 Nuclear Accident at Three Mile Island

Background

At about 4:00 a.m. on March 28, 1979, a failure of the condensate polishers resulted in the loss of a condensate pump, and the tripping of the secondary feedwater pumps and turbine of Unit 2 of the Three Mile Island Nuclear Power Station (TMI-2). With the loss of the main feedwater pumps, the auxiliary feedwater pumps started but were unable to provide the required steam generator flow because a number of manual valves, which were inadvertently left closed, blocked the flow path. With the loss of heat sink, the primary system pressure increased rapidly and resulted in a reactor trip, and the opening of the pressurizer power-operated relief valve. System pressure subsequently decreased to the point where the relief valve should have closed, while in fact, it remained opened. The primary system pressure continued to decrease and resulted in the actuation of the High

Pressure Injection (HPI) pumps. The continued drop in primary system pressure resulted in steam voids in the primary system and prevented the pressurizer water level from providing an accurate indication of the primary coolant inventory. Misinterpreting the condition of the plant, the operators turned off one of the HPI pumps and throttled back the other.

The pressurizer relief valve remained opened for two and a half hours releasing approximately 30,000 gallons of primary coolant onto the containment floor, and allowing radioactive krypton, iodine and xenon to escape to the environment.

At one hour and fifteen minutes into the transient the primary coolant pumps on one steam generator loop were manually tripped, apparently to prevent cavitation and resultant pump damage. The other two pumps were tripped 25 minutes later, leaving the reactor without forced convection and a heat sink. Reactor core cooling was restored at about 8:00 p.m. on March 28, by actuation of a Loop-A primary coolant pump, using the Loop-A steam generator as a heat sink.

Despite the fact that the accident was contained and the radioactivity released appears to have had no major consequences, TMI-2 disrupted the lives of thousands of people in the surrounding communities and has raised major questions concerning the future of commercial nuclear power in the U.S.

NRC Investigation

The NRC investigation of the TMI-2 event began almost immediately. At 7:09 a.m. March 28, 1979, the licensee contacted the NRC Region-I Office and by 8:15 a.m. the NRC Incident Response Center was activated. At 10:45 a.m. a group of five Region-I inspectors arrived at the site. The NRC site team increased to 29 on the next day and to 83 on the following day.

During the next two weeks the NRC Office of I&E issued a series of bulletins and information notices advising U.S. nuclear power facilities of the safety implications of the event and to request licensees to take specific actions to ensure the continued safe operation of their plants.[1-9] At the same time the NRC initiated a substantial effort to assess the implications of the TMI-2 accident on the present and future operation of commercial nuclear power plants. On April 11, 1979 President Carter established a commission to provide an independent in-depth evaluation of the accident and its implications.[10] The NRC reported the TMI-2 accident to Congress as an Abnormal Occurrence (79-3) in July 1979.[11] The major NRC and related investigations that focused (at least in part) on the probable cause(s) responsible for the TMI-2 accident are summarized in the following.[2]

Report of the Bulletins and Orders Task Force

The Bulletins and Orders Task Force (B&OTF) was established within the Office of NRR in early May 1979, to review and direct the staff TMI-2 activities associated with I&E Bulletins, Commission Orders[3] and the generic evaluation of feedwater transients and small-break LOCA for operating plants. The B&OTF was composed of approximately 30 technical professionals, organized

---

[2]A relatively complete list of TMI-2 documents (through July 1979) has been compiled by the NRC in Reference 12.

[3]The NRC Commission issued orders in early May 1979, to licensees of operating B&W plants, to shut down these plants until certain actions could be completed. These actions included: 1) improving the reliability of the auxiliary feedwater system, 2) installing a reactor trip on the secondary system, 3) analysis of transients and small reactor coolant system breaks, 4) updating operator training, and 5) analyzing control system reliability.

into an analysis group, a projects group and a systems group. The B&OTF reviewed the licensee response to the NRC Bulletins and Commission Orders and concluded that the actions taken by the licensees provided added assurance for the protection of the health and safety of the public. The basis of the generic assessment of the small break LOCA and feedwater transient was provided in a series of NRC staff evaluations.(13-17) The report also defined specific actions under which continued plant operation is acceptable.(18)

Report of the Special Review Group

The Office of Inspection and Enforcement established the Special Review Group (SRG) July 12, 1979 to review the lessons learned from the Three Mile Island Accident, with respect to the I&E role in preventing and responding to accidents. The members of the group were selected principally from the regional offices. The SRG reviewed the details of the event and the I&E Inspection and Emergency Response Programs, and identified several causes contributing to the event. The causes included system design, designation of safety related equipment, licensee administrative controls and technical competence, and deficiencies in the I&E inspection program. The SRG made recommendations concerning regulatory policy matters, I&E inspection policy, I&E organizational structure and the qualifications of inspection personnel.(19) This pointed out the need for reviews of NRC actions in the regulatory framework.

TMI-2 Lessons Learned Task Force

The Office of Nuclear Reactor Regulation established the Lessons Learned Task Force (LLTF) in May 1979 to identify and evaluate safety concerns resulting from TMI-2. The LLTF considered the areas of plant design, analysis and operations, and issued short-term recommendations in a report (NUREG-0578) issued in July 1979.[20] The short-term recommendations included the testing of safety relief valves, improved auxiliary feedwater systems, plant instrumentation, additional transient analysis, and improved emergency procedures. All nuclear power plants in operation or under construction were affected to varying degrees. The implementation of the short-term LLTF recommendations together with the requirements of the B&OTF were intended to address the TMI-2 related safety concerns for nuclear power plant operation in the near future.

The Lessons Learned Task Force completed its evaluation of TMI-2 related safety concerns in October 1979. In contrast to the short-term LLTF recommendations, the final report addressed concerns of a more fundamental policy nature.[21] The task force considered nuclear power plant design, operation and regulation. The principal deficiency identified by the task force was the failure by all levels and segments of the technology to recognize the fundamental role of the human element in both the prevention and response to accidents. With respect to NRC safety policy, the LLTF noted the absence of an articulate and widely recognized national nuclear safety policy which couples the various licensing requirements. The LLTF made specific recommendations for the NRC, vendors and licensees. The NRC recommendations included 1) the establishing of a NRC/utility program to evaluate operating experience[4], 2) the development and definition of nuclear power plant safety goals, 3) the establishing of a NRR emergency response team to support the NRC Incident Response Center, and 4) the revision of the procedures for NRC licensing reviews.

---

[4]The report noted that an Office of AEOD was presently being established to provide agency-wide coordination and overview of all NRC operational data analysis-related activities.

Investigation Into the Three Mile Island Accident by the Office of Inspection and Enforcement

The NRC Office of I&E investigation was conducted by an operational and radiological (14 member) team under the direction of the Region-I Deputy Director, during the period from March 28 to July 31, 1979. The purpose of the investigation was 1) to establish the facts concerning the TMI-2 event, and 2) to evaluate the performance of the licensee. The Investigation Report (NUREG-0600) provides a detailed recounting of the significant operational and radiological events that transpired during the accident.[22] The investigation resulted in the identification of inadequacies in six major areas that were contributing causes: 1) equipment performance, 2) transient and accident analysis, 3) operator training and performance, 4) equipment and system design, 5) information flow during the early hours of the event, and 6) emergency planning. The investigation concluded that the serious consequences of the accident could have been prevented in spite of these inadequacies, if the system and procedures were allowed to function as designed; for example, had the operators not shut down the HPI pumps. The investigation team identified 36 items of potential licensee noncompliance.

Staff Report on the Generic Assessment

On April 2, 1979 the Office of NRR established a task group to perform a generic assessment of feedwater transients in B&W plants, in order to make an immediate determination of the measures that would be required to prevent a recurrence of the TMI-2 event. Based on a detailed review of the plant design, operation and licensing basis the task group concluded that design improvements and other actions would be required before plant operation could resume.[5] The task group recommendations, documented in a report (NUREG-0560) issued in May 1979, included: 1) development of an improved NRC system for evaluating operating data, 2) evaluation of B&W plant design features with respect to interactions in coping with transients, 3) improving means for detecting a stuck-open relief valve, 4) improving operator training and emergency procedures, 5) evaluation of very small reactor coolant system breaks, and 6) analysis of plant interactions resulting from system failures and operator actions during transients and accidents.(23)

Rogovin Inquiry

In mid-June 1979 the Nuclear Regulatory Commission contracted with the law firm of Rogovin, Stern & Huge to conduct an inquiry into the TMI-2 accident, to assess the actions of the licensee and the NRC and to identify deficiencies in the system. The Special Inquiry Group consisted of NRC staff members, lawyers, and technical consultants. Input was also provided by outside organizations such as the national laboratories, engineering firms and the National Academy of Public Administration. A significant effort was made in the selection of the inquiry staff and in the use of outside consultants, to eliminate any conflicts of interest and to ensure the independence of the investigation.

The conclusions and recommendations of the Special Inquiry Group were published in January 1980.(24) The major conclusion of this investigation was that the principal deficiencies of the

---

[5]The actions specified in the Commission shutdown orders were, in part, a result of the generic task group evaluation.

nuclear power industry are not hardware problems but are management problems in both the industry and in the NRC. The recommendations included: 1) a shift in NRC emphasis from design review to the monitoring of operating reactors, 2) the strengthening of the on-site technical capabilities and utility management, 3) a completely overhauled licensing system, 4) application of quantitative risk assessment methods, and 5) improvements in evacuation criteria and planning for existing reactors and remote siting for new reactors.

Kemeny Commission

The President's Commission was established to conduct a comprehensive study and investigation of the TMI-2 accident. The Commission, together with its staff and the help of consultants, examined the sequence of events in detail, analyzed the radiation releases, examined the role of the utility and its suppliers, and reviewed the emergency plans and media coverage.[10] The investigation concluded that the root cause was people-oriented rather than deficiencies in plant design or equipment. The Commission also concluded that: 1) the training of the TMI-2 operators was deficient, 2) the environmental releases will have a negligible effect on the physical health of the public, and 3) the licensee had not given sufficient attention to management qualification and attitudes required for operating a nuclear power plant.

The Commission reviewed in detail the NRC organization, role in licensing and performance. The inadequacies identified included: 1) a preoccupation with regulations rather than with safety, 2) an inappropriately sharp distinction between safety-related and non safety-related equipment, 3) the licensing of plants with unresolved safety issues remaining, 4) the lack of a systematic method for evaluating operating plant data, and 5) a highly compartmentalized organization with insufficient communication between the various offices.

2.6.3 Failure of Automatic Reactor Trip System (Salem-1)

Background

On February 22, 1983 the Salem Unit-1 reactor control rods failed to insert upon receipt of an automatic reactor protection system (RPS) signal resulting from low steam generator level. At the same time, however, the operator, realizing the steam generator level was too low, initiated a manual scram which resulted in the insertion of the control rods and a successful plant shutdown. Not realizing that an automatic trip signal had been initiated, the operators were unaware the automatic scram system had failed and the first anticipated transient without scram (ATWS) in a licensed U.S. PWR went unnoticed.

Again on February 25, while at 12% power, a low-low steam generator water level at Salem-1 initiated a reactor trip signal. Upon receipt of the trip signal the RPS failed to insert the control rods and shut down the reactor. About 25 seconds later the operators initiated a manual scram which resulted in the insertion of all control rods and a successful reactor shutdown.

These events at Salem-1 are of major safety significance since the required automatic reactor scram system operability was lost, leaving only the operator to control the reactor during plant transients. This scram system operability is required to safely protect the reactor from anticipated reactor transients and is assumed in the plant safety analysis.

The failure of the Salem-1 automatic scram signal to result in the insertion of the control rods has been traced to the failure of the reactor trip breaker (Westinghouse (W) model DB-50) under-voltage (UV) attachment to open upon receipt of the trip signal. The failure of the breakers to open is believed to be due to a combination of the following: 1) wear, 2) lack of lubrication, 3) improper maintenance, 4) more frequent operation than intended by design, 5) dust and dirt, and 6) nicking of the latch surfaces from repeated breaker operation.

Aside from the technical issues, the Salem reactor trip system failure event has major significance with respect to NRC event investigations. Both the licensee and NRC investigations failed to identify the February 22, 1983 ATWS event. In addition, while immediately following the February 25, 1983 ATWS event a failed trip breaker was sent to Westinghouse for examination and testing, the initial NRC tests were performed on a trip breaker that had actually not failed. The manner in which the testing of the trip breakers was carried out suggests that a substantial degree of overlap and interference may have existed between the various event investigations. The treatment of the failed UV trip attachments also underlines the need for "freezing" (to the extent possible) the plant equipment and data after a significant event. In this instance the NRC, vendor and licensee investigation procedures failed to insure a well coordinated and efficient investigation of the event.

NRC Investigation

The NRC began a follow-up inspection of the February 22 Salem-1 reactor trip on February 23, 1983.[25] This included a review of the licensee internal event report and of available plant data and recordings. The licensee internal report stated (incorrectly) that the reactor had tripped automatically before the manual trip was initiated. During a subsequent NRC meeting with the Assistant Plant Manager on February 26, 1983 it became evident, after review of the sequence-of-events computer printout, that the February 22 Salem-1 scram was a result of the manual trip and that the automatic scram system had again failed to function.

In response to the initial findings the NRC Office of Inspection and Enforcement issued I&E Bulletin 83-01 dated February 25, 1983(26). The bulletin informed all U.S. nuclear power facilities of the details of the Salem-1 event and required PWRs with Westinghouse DB-50 breakers to 1) test the Westinghouse breakers, 2) assure that maintenance is consistent with the recommended Westinghouse programs, 3) notify licensed operators of the Salem-1 events, 4) review with the operators the procedures to follow in the event of trip system failures, and 5) report the results to the NRC.

Although not required by I&E Bulletin 83-01, in early March, 1983 Southern California Edison tested the General Electric AK-2 under-voltage trip attachments of the Combustion Engineering San Onofre Units 2 and 3. As a result of four UV trip attachment failures during these tests and previous failures at these units during 1982[6], the NRC issued I&E Bulletin 83-04 on March 1, 1983(27) to all licensed PWR Facilities, except those with Westinghouse DB-50 breakers. This bulletin described the San Onofre and related failures and required 1) actions similar to Bulletin 83-01, 2) licensees to inform the NRC of all previous RPS breaker malfunctions not previously reported, and 3) licensees to verify that the testing, procurement and maintenance

---

[6]Some of these early failures were initially not reported as a result of personnel error but were subsequently reported in LER 82-176/IT-0 on 4/12/83.(34)

treat the RPS breakers and UV attachments as safety-related equipment. The NRC closely monitored the response to Bulletins 83-01 and 83-04 and the corrective actions taken by the licensees to assure that the plants could continue to operate safely.

On April 1, 1983 the NRC issued I&E Information Notice 83-18[28] informing nuclear power reactor facilities of the results of the testing required by I&E Bulletins 83-01 and 83-04, and of the various safety aspects of the breaker failures and the Salem-1 event in general. The NRC staff also conducted meetings with the individual reactor vendors and the Institute for Nuclear Power Operations (INPO) on the implications of the Salem-1 events.[29]

On February 28, 1983 the NRC Executive Director of Operations (EDO) directed that 1) the NRC Region-I develop a fact-finding report of the Salem-1 events, and 2) an interoffice task force be formed to investigate the generic implications of the Salem-1 events. The NRC Region-I Task Force conducted a fact-finding and data collection review of management and administrative controls which should have insured proper operation of the reactor trip breakers. The fact-finding task force was unable to identify any new significant information relating to the cause of the breaker failures. The results of the task force investigation were documented in a report (NUREG-0977) issued in March 1983.[30]

In support of the NRC generic interoffice investigation, Franklin Research Center (FRC) was requested to determine the possible and probable failure modes of the Westinghouse-DB breaker under-voltage trip attachments. FRC concluded that the most probable failure mechanisms are due to wear aggravated by lack of maintenance.[31]

Westinghouse conducted an independent testing and evaluation program[32] to identify the under voltage trip attachment failure mechanism, and concluded that the probable malfunctions include: 1) frictional area anomalies, 2) dirt/contamination, 3) bent or deformed parts, and/or 4) misadjustment.

Both the NRC's consultant (FRC) and the licensee performed measurements of the circuit breaker trip-force requirements. FRC measurements performed on March 17, 1983 indicated that the expected Westinghouse 31-oz maximum trip-bar lift-force requirement was exceeded by one of the six breakers tested.[29]

On March 24 and 25, 1983, the licensee performed independent measurements on four Salem circuit breakers to determine (1) the circuit breaker trip bar lift force requirements and (2) the under-voltage trip attachment output forces. These tests indicated that the trip-bar static lift-force for three of the four breakers tested exceeded the expected Westinghouse 31-oz maximum. However, for all breakers measured, the UV trip attachment output impulse forces exceeded the trip bar impulse lift forces.[31]

The manner in which the testing of the Salem-1 under voltage trip attachments (UVTAs) was carried out suggests that a significant degree of overlap and interference existed between the various investigations. Immediately following the February 25, 1984 ATWS event, the four Salem-1 reactor trip circuit breakers (reactor trip breaker [train A and B] and bypass breaker [train A and B]) and under voltage attachments were removed by the licensee and brought to the electrical maintenance area.[31] During this period immediately following the February 25 ATWS event, the failed (B-Train) UVTA was lubricated[31,32] and the failed (A-Train) UVTA was disassembled and damaged.[31] The two failed Salem-1 under-voltage trip attachments (reactor trip breaker attachments A and B) were subsequently provided by the licensee to Westinghouse (the B-Train UVTA on February 28, 1983 and the A-Train on March 2, 1983) for testing and evaluation[7]; as a result, the failed Salem-1 UVTAs were unavailable to Franklin Research(29,31) and the initial NRC/FRC tests were performed on an unfailed Salem-2 UVTA.(31) At the time, NRC was, in fact, unaware that it had the "wrong" breaker. After Westinghouse had completed its testing and evaluation of the failed UVTAs, they were sent (disassembled) to FRC on April 15, 1984 for testing.(29)

It is also important to note that in this case the lubrication and damaging of the failed UVTAs after the event, and apparent confusion as to which breakers had failed, made it unnecessarily difficult to identify the actual failure mechanism and establish the root cause of the Salem-1 break failures.(29) This again underlines the importance of "freezing" (to the extent possible) the plant equipment and data after a significant event.

The interoffice task force considered licensee management, reactor trip system design and performance, and ATWS events and rulemaking in determining the generic implications of the two Salem-1 ATWS events. The generic implications were described in the task force report (NUREG-1000, Volume 1) issued in April 1983.(29) The report concluded that causes contributing to the events were licensee management control and reactor trip system reliability. It further recommended that the proposed NRC ATWS rule be amended to require that W plants include a diverse scram system.

---

[7]See References 29 and 31.

Based on the conclusions of the Salem-1 Generic Implications Task Force (NUREG-1000, Volume-1), and comments and recommendations of the Committee to Review Generic Requirements (CRGR), the NRC Program Offices and the Commission, the NRC staff has developed (NUREG-1000, Volume-2) intermediate term actions to be taken by 1) the licensees and applicants, and 2) the NRC staff.(33) The required licensee actions include: 1) post-trip review, 2) equipment classification and vendor interface, 3) post maintenance testing, and 4) trip-system reliability improvements. Recommendations for NRC improvements cover the following areas: 1) NRC oversight of licensee management, 2) NRC role in restart decisions, 3) NRC vendor inspections, 4) NRC I&E Bulletin follow-up, and 5) NRC codification of good operating practices.

In late March 1983, the Office of Analysis and Evaluation of Operating Data (AEOD) conducted a study to review and evaluate the Salem-1 ATWS events and to consider whether a trends and patterns analysis of previously reported trip breaker failure data would have identified a significant potential for an ATWS at Salem-1. The AEOD study report (AEOD/P301) issued in July 1983 concluded that because of the nature of the failure data, a trends and patterns analysis would most likely not have identified a significant ATWS potential.(34)

The Salem-1 automatic reactor trip system failure was reported to Congress as an Abnormal Occurrence (83-3) in September 1983.(35)

2.6.4 Improper Control Rod Manipulation at Quad Cities-1

Background

On March 10, 1983 Quad Cities Unit-1 was being shut down for a weekly maintenance outage. During the day shift on March 10, the plant nuclear engineer requested that the Rod Worth Minimizer (RWM) be bypassed, so that a new shutdown control rod sequence could be loaded into the RWM computer. The RWM provides a backup to procedural controls, to limit control rod reactivity insertion and the consequences of the design basis control rod drop accident during startup and low power (<30% of rated power) operation. The RWM blocks rod movements which result in control rod patterns that differ from predetermined allowed (low rod worth) patterns. After the new shutdown pattern was loaded, the RWM was left in a bypassed condition.

Prior to the commencement of Unit-1 shutdown, an additional reactor operator was requested to assist with the control rod insertion. At approximately 8:00 p.m. the two reactor operators, misinterpreting the approved control rod sequence procedure, began to insert the control rods and by 10:15 p.m., 33 control rods had been improperly inserted. At this time, contrary to operating procedures which require that recirculation pump speed be reduced manually at set intervals during control rod insertion, the recirculation pumps automatically ran back to minimum pump speed reducing power to ∿ 20%.

At about 11:10 p.m. the RWM was returned to service. Because of the large number of out-of-sequence control rods, no error messages were displayed; however, the RWM would not allow any additional rod motion. After failing to clear the rod block, the operators (after discussion with the shift supervisor) declared the system inoperable and bypassed the RWM. Ten additional rods were improperly inserted before the reactor was manually scrammed (at 9% power) as part of the normal shutdown procedures.

These events are of major safety significance in that the RWM and control rod sequence are intended to mitigate the consequences of the design basis reactivity insertion event, and improper use of these features could lead to fuel damage.

NRC Investigation

The NRC investigation of the Quad Cities-1 improper control rod manipulation event began on March 11, with an unannounced special safety inspection by the Region-III Resident Inspector.[36] The inspection continued until March 29, 1983 and identified failures of the licensee to follow control rod sequence and reactor shutdown procedures, to follow administrative procedures, and to maintain accurate records. The NRC also found that plant personnel did not perform at the level expected during normal operational events. The licensee issued a Licensee Event Report on March 24, 1983.[37] The NRC issued an I&E Information Notice (No. 83-75) on November 3, 1983 describing the Quad Cities-1 event and a related event at Hatch-2.[38] The event was reported to Congress as an Abnormal Occurrence (83-07) by the NRC in April 1984.[39]

2.6.5 Failure of Control Rods to Insert Fully During a Scram

Background (Browns Ferry-3)

On June 28, 1980, while Browns Ferry Unit-3 (BF-3) was being shut down to allow repairs to the feedwater system, a manual scram from $\sim$ 35% power failed to insert 76 out of the total of 185 control rods. The control rods which failed to insert were located on one side (the east side) of the reactor. A second manual scram was initiated 6 minutes after the first, and ultimately three additional manual scram attempts over a period of 14 minutes were required to completely insert the control rods.

The control rod drives (CRDs) in a BWR are essentially water-driven hydraulic pistons. During scram, a scram inlet valve is opened and high pressure water is applied to the bottom side of the piston, while at the same time, a scram outlet valve is opened to relieve the water pressure above the piston. Upon initiation of the scram, the pressure imbalance across the CRD piston drives the control rod rapidly into the core. The water discharged from the CRD is collected in one of the two separate scram discharge volumes (SDVs) located on opposite sides of the reactor. During normal operation the scram discharge volume is drained continuously to the Scram Discharge Instrumentation Volume (SDIV), and is designed to provide the free volume required by the discharge water during scram. The SDIV instrumentation monitors water level and provides a scram signal on high level, to protect from situations where adequate free volume is not available in the SDV.

The Browns Ferry-3 CRDs are grouped so that the east and west side drives empty into separate SDVs. Testing, inspections and analyses subsequent to the BF-3 partial scram have indicated that at the time of the event the east side SDV was essentially full of water and prevented the full insertion of the east side control rods. Prior to each subsequent manual scram, the reactor protection system was reset and the SDV was partially drained, thus allowing additional east side control rod insertion with each scram. The flooding of the east side SDV is believed to be due to inadequate drainage into the SDIV as a result of 1) blockage in the line between the SDV and SDIV, and/or 2) inadequate SDV venting.

NRC Investigation

Immediately following the BF-3 partial scram the NRC initiated a site investigation with a team of two resident inspectors and a Region-II core physicist. On July 2, 1980 a headquarters team with representatives of I&E, AEOD and NRR arrived at the site to obtain detailed information on the event, the BF-3 scram system, and results of licensee scram tests. Under the direction of the Region-II Director, examination of licensee procedures and records, personnel interviews, and observation and evaluation of licensee and vendor[8] tests were carried out. The investigation included reviews of both the mechanical and electrical systems. The Inspection Report concluded that the most likely cause of the event was the accumulation of water in the east side SDV header.(40) The exact cause of this accumulation was not definitely established. Several apparent SDV design deficiencies were identified and were referred to I&E headquarters and NRR for evaluation.

Preliminary I&E notifications were issued on June 30, July 3 and July 14, 1980 informing all NRC offices of the details of the event.(41,42,43) Region-II confirmed the licensees investigation plans on June 30, 1980. On July 3, 1980 I&E issued Bulletin 80-17 which required BWR licensees to perform additional testing, verification and surveillance to assure that conditions similar

---

[8]Observation of control rod drive tests conducted by GE in San Jose were observed by a Region-V Inspector.

to those at BF-3 do not exist at other facilities.(44) Licensee corrective action was also required to prevent significant accumulation of water in the SDV and to enhance mitigation in the case of a scram failure. After evaluation of as-built SDV piping configuration drawings and standby liquid control system (SLCS) administrative procedures, the NRC issued Supplement-1 to I&E Bulletin 80-17 on July 18, 1980.(45) The supplement requested additional analysis of the as-built SDV system and revisions to the SLCS procedures. The NRC held regional follow-up meetings with licensees in early August to obtain plant specific as-built configurations of the scram discharge systems (SDSs).

The results of the testing required by I&E Bulletin 80-17 raised questions concerning 1) the adequacy of the SDV venting, and 2) the integrity of the SDV level switches.[9] In response to these concerns, I&E issued Supplement-2 to Bulletin 80-17(46) on July 22, 1980, requiring all BWR licensees having BF-3 type SDSs to provide a vent path continuously open to the building atmosphere. On August 22 I&E issued Supplement-3 to Bulletin 80-17 requiring functional testing of the SDV level switches. On September 12, 1980 the I&E report documenting the BF-3 followup inspections of required licensee corrective actions was issued.(47)

With the Region-II and headquarters teams as site contacts, immediately following the event AEOD initiated an investigation to determine the event cause and to recommend corrective actions. The investigation made use of results of scram system tests performed by both the licensee and General Electric and

[9]The SDIV level instrumentation had also been addressed in a previous I&E Bulletin (80-14).

considered RPS electrical malfunctions, control rod drive failures, and the hydraulics of the scram discharge and instrumentation volumes. The investigation concluded, in an AEOD report (AEOD/C001) issued one month after the event,[48] that 1) the loss of scram capability was due to the presence of water in the east side scram discharge header, and 2) mechanisms exist which can result in the undetected filling of the SDV. It also identified certain scram events (involving failure of the SDIV vent or SIV drain to close) which could result in an unisolatable reactor coolant system blowdown outside of primary containment.

An investigation of the generic issues, raised by the BF-3 partial failure to scram event and related SDS instrumentation failures at Brunswick and Hatch-2, was performed by the office of Nuclear Reactor Regulation (NRR). This evaluation included a detailed review of the BWR scram discharge system and SDV design criteria proposed by the BWR owners group. The results of this investigation were reported in the Generic Safety Evaluation Report issued in December 1980,[49] and provided the basis for continued BWR plant operation.

Prompted by the deficiencies identified in the initial AEOD investigation (AEOC/C001) with respect to scram capability and reactor coolant boundary and primary containment functions, AEOD conducted a follow-up study of the SDS passive failures (i.e., pipe breaks). The results of this study were published in May 1981 and indicated that in the event of a SDV pipe break during a reactor scram, the termination of the reactor coolant system blowdown outside of primary containment would require the closure of the scram outlet valves. Based on a review of the scram discharge system, it was concluded that the outlet valve and system piping design may not be adequate to satisfy the required safety criteria. To address these concerns the study recommends that 1) corrective action be determined and implemented (if necessary) to assure the mechanical integrity of the BWR SDV components, and 2) a determination be made of the need to include SDV pipe breaks in the design basis.

As a result of these concerns, BWR licensees were required to perform a plant-specific safety evaluation. As guidance in performing this evaluation, NRR issued NUREG-0803 in August 1981.[50] The report provided the conditions under which 1) the SDV piping system design is acceptable, and 2) the safety concerns associated with a postulated SDV pipe failure do not represent a dominant contribution to the risk of core melt.

The Browns Ferry-3 partial failure to scram event was reported to Congress as an Abnormal Occurrence (80-6) in November 1980.[51]

2.6.6 Uncontrolled Leakage of Reactor Coolant Outside Primary Containment (Hatch-2)

Background

On August 25, 1982, while at rated conditions, Hatch-2 experienced a reactor scram and a vessel isolation as a result of an unexpected Main Steam Isolation Valve (MSIV) closure. The initial MSIV closure resulted in a rapid increase in core pressure, void collapse and a subsequent high neutron flux trip. The steam flow redistribution to the remaining open main steam lines caused a high steam flow Group-1 vessel isolation. With the reactor vessel isolated, pressure increased rapidly lifting the "D" safety relief valve (SRV). In order to increase the rate of reactor vessel blowdown, the operators attempted to manually open the "H"

SRV. The "H" SRV failed to open and the operators then manually actuated the "A" SRV. During this period the Reactor Core Isolation Cooling (RCIC) and High Pressure Coolant Injection (HPCI) were used to control reactor water level.

At 4:49 a.m. the "A" SRV was opened (for the second time) to reduce reactor pressure and equalize pressure around the closed MSIVs. A few minutes after SRV actuation, a high drywell pressure scram occurred with all systems responding as designed. It is now believed that the "A" SRV discharge line vacuum breaker failed to close during the first actuation and allowed steam to pass directly into the drywell during the second actuation. As a result of the high drywell pressure signal, the drywell chillers were tripped, interrupting normal drywell cooling and eliminating the normal means for reducing drywell pressure.

Following the initial scram the SDV drain valve failed to close and allowed hot discharge water to pass from the pressurized reactor coolant system into the building equipment drainage system. At 5:10 a.m. the RCIC isolated while it was injecting into the vessel. It is now believed that the RCIC isolation was the result of damage caused by steam released through a RCIC room equipment drain hub with a missing cover.

In order to terminate the SDV discharge into the equipment drainage system, the operators closed the scram outlet valves by first reducing the drywell pressure below the 2.0 psig trip setpoint (by restarting the drywell chillers) and then resetting the high pressure drywell scram. The scram outlet valves were closed at approximately 7:40 a.m.

This event is significant in that it resulted in an uncontrolled reactor coolant system blowdown outside of primary containment from hot operating conditions. In addition, while at no time during the event was there a threat of inadequate core cooling, the equipment drain system may have channelled the locally harsh environment, created by the high energy discharged fluid, to parts of the reactor building where the environmental qualification of safety-related equipment may have been exceeded.

The Hatch-2 uncontrolled leakage outside of primary containment event has special significance with respect to NRC event investigations. The event was not initially (fully) disclosed by the licensee, and not identified by the initial NRC investigation. Only the NRC Office of AEOD, as a result of some exceptional investigatory work, ultimately identified the event, approximately eight months after the event had occurred.

NRC Investigation

The initial licensee (10 CFR 50.72) notification to the NRC reported the event as non-emergency and only indicated the MSIV closure and subsequent reactor trip.(52) The NRC Region-II daily report made no mention of the RCIC failure, the SDV drain valve failure, and the Reactor Coolant System (RCS) blowdown.(53) The event was reported in a Licensee Event Report but only with respect to the failure of the "H" SRV.(54) In a revision to a later LER, issued April 26, 1983, the August 25 Hatch-2 event was identified as the cause of the RCIC failure on August 28, 1982 and discussed in some detail.(55)

The NRC Office of AEOD began the investigation of the Hatch-2 event a few days after the event and contacted the site on August 30. Afer reviewing the information available, AEOD telecopied a request for additional data to the licensee on September 9, 1982. The licensee provided the NRC with an event summary on about November 1, 1982.[56] However, the summary failed to mention the uncontrolled RCS blowdown, and the failure of the "H" SRV and SDV drain valve. In response to a request by AEOD, a follow-up site meeting was held on April 26, 1983 and essentially all the details of the event were disclosed.

The AEOD evaluation of the Hatch-2 reactor coolant leakage event was completed in August 1983 and documented in an AEOD draft report. The final AEOD report (AEOD/C403) was issued in May 1984 and concluded that most of the underlying causes of the event had been addressed in earlier NRC correspondence to the licensee, and had the lessons of previous operating experience been implemented at Hatch-2, the event could have been avoided.[57] Specifically the report notes that: 1) the MSIV failure was the subject of an I&E Information Notice issued in 1981, 2) the importance of reactor building equipment drain covers and the need for adequate administrative controls over these devices were addressed in an I&E Circular to BWR licensees issued several years prior to the event[58], and 3) the SDV drain valve failure might have been avoided if the licensee had implemented Technical Specification changes proposed by the NRC in 1980.[59] (The Technical Specification changes were, in part, the result of the BF-3 partial failure to scram investigation; see Section 2.6.5.)

The report recommended the following NRC actions: 1) the Office of I&E follow up the circular concerning the placement of the equipment drain hub covers[7], 2) the Office of NRR assess the extent to which mitigation systems might be degraded during a steam line break accident as a result of steam being channelled through the reactor floor drain system, and 3) the Office of I&E consider issuing an information notice describing the Hatch-2 and related events.

The Region-II Resident Inspector followed the licensee's review and follow-up repairs of the equipment failures including: 1) the failed MSIV, 2) the failed SRV, 3) the failed SDV drain valve, 4) the missing drain cover, and 5) the damaged RCIC equipment.

The Hatch-2 uncontrolled leakage of the reactor coolant outside of primary containment was reported to Congress as an Abnormal Occurrence (83-6) in April 1984.[60]

2.6.7 Overexposure of Radiation Workers' Hands

Background

Nuclear Metals, Inc. operates a foundry for melting, alloying and casting depleted uranium metal. The uranium metal is placed in graphite crucibles and loaded into a vacuum furnace by foundry workers. After the uranium metal is melted and poured into castings, foundry workers, using leather gloves, remove the crucibles from the furnace and clean them for reuse.

The beta dose rate at the surface of uranium metal is typically ∿ 230 millirads/hr. However, when uranium is melted the decay products (primarily Th-234 and Pa-234m) are physically separated and are deposited on the surfaces of the crucibles, fire brick and inside the furnace. The beta dose rate from these separated decay products is substantially higher than that for the original metal. In addition, these decay products may easily be transferred to the workers' gloves, for example, during the handling of the fire brick and crucibles.

In November 1982, the licensee's health physics staff found that the leather gloves worn by the foundry workers were routinely contaminated upon completion of a uranium melt. Initial licensee measurements, made with the gloves turned inside out, indicated radiation levels as high as 1000 millirems. While foundry workers were required to wear wrist badges, these were too far removed to adequately monitor hand exposures.

Subsequent measurements indicated that beta radiation dose rates of $\sim$ 1 rem/hr existed inside the gloves, and that 10-15 foundry workers received hand exposures of up to 125 rems per quarter, during both the last quarter of 1982 and the first quarter of 1983. The NRC quarterly limit to extremities is 18.75 rems.

NRC Investigation

The NRC investigation of this event was initiated in May 1983, after notification by the licensee that a problem involving hand contamination of foundry workers had been identified. The NRC Region-I Office responded by conducting on-site inspections of the licensee's Radiation Safety Programs on May 26-27 and June 8-10, 1983.[61]

During the second inspection on June 9, 1983, NRC inspectors obtained a contaminated glove from the licensee and made preliminary on-site dose rate measurements. The contaminated glove was then transferred to the Idaho National Engineering Laboratory (under contract to the NRC) for a more accurate dose rate measurement and identification of radionuclides. Based on these more accurate dose rate measurements and interviews with site personnel, it was concluded that the typical extremity dose was 125 rems per quarter for 10-15 foundry workers. An NRC medical consultant examined the workers' hands and found no indication of radiation injury; however, observation is continuing.

NRC enforcement meetings were held at the Region-I Offices on July 27 and August 2, 1983. An NRC I&E Information Notice (No. 83-73) was issued on October 31, 1983 informing licensees of the details of this event.[62]

On September 1, 1983 the NRC issued a Notice of Violation and proposed imposition of civil penalties for several licensee deficiencies including; weaknesses in the management control of the site radiation program which resulted in inadequate determination of the exposure of workers' hands, and inadequate extremity dosimetry.

This overexposure event was reported to Congress as an Abnormal Occurrence (83-8) in April 1984.[63]

2.6.8 Conclusion

Present Event Investigations

The preceding review of selected significant events provides a basis for evaluating NRC event investigations. While it is recognized that because of limitations of time the list of events reviewed is very limited and that the events were not randomly selected, it is believed that the conclusions made are generally applicable to present NRC event investigations. The following is a summary of the way in which NRC investigations of significant events are conducted.

a) The event investigations are carried out by members of the NRC staff with a wide range of technical expertise, and representing all of the appropriate NRC offices.

b) In the investigation of the more significant events, NRC interoffice Task Groups are established to accomplish specific tasks such as fact finding and evaluation of generic issues.

c) The NRC investigations require the full cooperation of the licensee and equipment vendors.

d) The more significant event investigations include detailed review and evaluation of the facility operations, licensing basis, and resulting generic issues.

e) During the investigation, affected licensees are kept completely informed of the details of the event and potential safety concerns through NRC Office of I&E Information Notices. As safety issues develop during the investigation, the licensees are informed by I&E Bulletins and may be required to respond to specific safety issues.

f) The event investigation may result in specific recommendations for changes in facility configuration, and licensee and NRC procedures.

g) The NRC event investigation analyses and recommendations undergo detailed review by the appropriate NRC offices and review committees, the ACRS and NRC Commission.

h) In the case of the TMI-2 investigation, the NRC contracted with an outside consultant to perform an independent review of the actions taken by the NRC and the licensee.

<u>Event Investigation Improvements</u>

While the NRC investigation of significant events as described above satisfies the required regulatory objectives, the following areas have been identified for possible improvement.

a) At present there is no organization with the sole responsibility for performing the investigation of significant events with the primary focus of determining probable cause. Typically, an event is investigated by the various NRC offices, by the licensee and (as required) by the equipment vendors. Each of these investigations is performed with a specific objective, and while determination of probable cause is an important consideration, it is the judgment of the Task Force based upon a review of NRC investigation reports which tend to emphasize regulatory concerns that the determination of cause is generally not the primary focus of the investigation.[10]

b) Both the overlap and interference of the various NRC, licensee and equipment vendor investigations (e.g., as in the Salem-1 investigation), and also the adversarial nature of the NRC investigations as viewed by the utilities make timely and accurate data collection and fact finding and probable cause determination difficult.

c) The licensee, being most familiar with the plant equipment design and performance, and having firsthand knowledge of the event, generally provides the principal input to the fact finding. Consequently, especially in the case of events believed to be less significant, the licensee frequently takes the lead in the investigation of the event. This situation gives rise to a potential licensee bias in the investigation.

d) By either action or inaction the licensee, the vendor, and the NRC are potential contributors to the cause of an event. Although no bias has been identified in any of the investigations, the possibility that the investigating organization may

---

[10]See, for example, NRC Inspection and Enforcement Manual, Inspection Procedure 93702, "Onsite Followup of Events at Operating Power Reactors," dated August 13, 1984.

itself have contributed to an accident or event introduces the potential for an unrecognized investigatory bias.

e) Significant events are not always identified in a timely manner (see, for example, the Hatch-2 event). The delays in event identification are due, in part, to the failure of the licensee and NRC to recognize the significance of the event and/or of the licensee to provide a complete and accurate description.

f) In some instances, the NRC event investigation reports undergo extensive delays (in some cases more than a year) as a result of the failure of the licensee to release data and the time consuming nature of interoffice concurrence of the draft reports (see, for example, the Hatch-2 event).

g) There is a need to "freeze" (to the extent possible) the plant equipment and data after a significant event and to ensure that evidentiary equipment and records are properly identified for examination and tests (see, for example, the Salem-1 event).[11]

h) There is no single comprehensive event report that includes the event description, fact finding, probable cause determination and resulting recommendations.

---

[11]The NRC Office of I&E has recently issued an Event Followup Inspection Procedure (I&E Procedure 93702, dated August 13, 1984) in response to the Salem-1 event which requires the inspector to assure that the licensee (when possible) (1) preserves in an undisturbed state the components that misoperated or failed, and (2) informs the NRC before repairing the failed equipment.

References

1. NRC Office of Inspection and Enforcement Bulletin (79-05), dated April 2, 1979.

2. NRC Office of Inspection and Enforcement Bulletin (79-05A), dated April 5, 1979.

3. NRC Office of Inspection and Enforcement Bulletin (79-05B), dated April 2, 1979.

4. NRC Office of Inspection and Enforcement Bulleti. (79-06), dated April 11, 1979.

5. NRC Office of Inspection and Enforcement Bulletin (79-06A), dated April 14, 1979.

6. NRC Office of Inspection and Enforcement Bulletin (79-06A Rev. 1), dated April 18, 1979.

7. NRC Office of Inspection and Enforcement Bulletin (79-06B), dated April 14, 1979.

8. NRC Office of Inspection and Enforcement Bulletin (79-08), dated April 8, 1979.

9. NRC Office of Inspection and Enforcement Preliminary Notification of Event; PNO-79-67,67A-67F, Dated March 28 - April 1, 1979 and PNO-79-77 (NRR), dated April 10, 1979.

10. Kemeny, J.G. et.al., Report of the President's Commission on the Accident at Three Mile Island, October 30, 1979.

11. "Report to Congress on Abnormal Occurrences January - March 1979," Vol. 2, No. 1, NUREG-0090. July 1979.

12. "Title List of Publicly Available Documents on Three Mile Island Unit-2 Docket 50-320," NUREG-0568, July 1979.

13. "Generic Evaluation of Small-Break LOCA Behavior in B&W Designed Operating Plants," NUREG-0565, January 1980.

14. "Generic Evaluation of Small-Break LOCA Behavior in Westinghouse Designed Operating Plants," NUREG-0611, January 1980.

15. "Generic Evaluation of Small-Break LOCA Behavior in Combustion Engineering Designed Operating Plants," NUREG-0635, Feb. 1980.

16. "Generic Evaluation of Small-Break LOCA Behavior in General Electric Designed Operating Plants," NUREG-0626, January 1980.

17. "Generic Assessment of Delayed Reactor Coolant Pump Trip During Small Break LOCA in PWRs," NUREG-0623, November 1979.

18. "Report of the Bulletins and Orders Task Force," NUREG-0645, January 1980.

19. "Report of Special Review Group of Office of Inspection and Enforcement on Lessons Learned From Three Mile Island," NUREG-0616, December 1979.

20. "TMI-2 Lessons Learned Task Force Status Report and Short-Term Recommendations," NUREG-0578, July 1979.

21. "TMI-2 Lessons Learned Task Force Final Report," NUREG-0585 October 1979.

22. "Investigation Into the March 28, 1979 Three Mile Island Accident by the Office of I&E," NUREG-0600, August 1979.

23. "Staff Report on the Generic Assessment of Feedwater Transients in PWRs Designed by B&W," NUREG-0560, May 1979.

24. M. Rogovin, et.al., "Three Mile Island a Report to the Commissioners and to the Public," Volume-I, January 1980. (NUREG/CR-1250)

25. Letter from R.W. Starostecki (NRC) to R.A. Udertz (PSEG), dated April 11, 1983, and attached Region-I Inspection Reports 50-272/83-06, 50-311/83-05.

26. IE Bulletin 83-01, "Failure of Reactor Trip Breakers (Westinghouse DB-50) to Open on Automatic Trip Signal," February 25, 1983.

27. IE Bulletin 83-04, "Failure of Undervoltage Trip Function of Reactor Trip Breakers," March 1983.

28. IE Information Notice 83-18, "Failures of Undervoltage Trip Function of Reactor Trip Breakers," March 1983.

29. "Generic Implications of ATWS Events at the Salem Nuclear Power Plant," NUREG-1000, Vol. 1, April 1983.

30. "NRC Fact-Finding Task Force Report on the ATWS Events at Salem-1 on February 22 and 25, 1983," NUREG-0977, March 1983.

31. "Evaluation of Failure to Trip of Reactor Trip Circuit Breakers on February 22 and 25, 1983, Salem Nuclear Generating Station Unit-1," Docket 50-272 Interim Franklin Research Center Report to USNRC, dated April 7, 1983.

32. Letter from E.P. Rahe (W) to H. Denton (NRC), NS-EPR-27-37, dated March 22, 1983.

33. "Generic Implications of ATWS Events at the Salem Nuclear Power Plant," NUREG-1000, Vol. 2, July 1983.

34. "Implications of the ATWS events at the Salem Nuclear Power Plant on the NRC Program for Collection and Analysis of Operational Experinece," Office of AEOD Report-AEOD/P301, July 1983.

35. "Report to Congress on Abnormal Occurrences July-September 1983," NUREG-0090, Vol. 6, No. 3.

36. NRC IE Region-III Inspection Report No.50-254/83-11 (DPRP).

37. Letter (NFK-83-112) from N. Kalivianakis (CE) to J. Keppler (NRC), dated March 24, 1983 with LER/RO83-I2/O1T-0 attached.

38. IE Information Notice 83-75, "Improper Control Rod Manipulation," dated November 3, 1983.

39. "Report to Congress on Abnormal Occurrences July-September 1983," NUREG-0090, Vol. 6, No. 3.

40. Letter from J.P. O'Reilly (NRC) to H.G. Parris (TVA), dated August 8, 1980, and attached Region-II Inspection Reports, 50-259/80-32, 50-260/80-25, 50-296/80-26.

41. IE Preliminary Notification, June 30, 1980.

42. IE Preliminary Notification, July 3, 1980.

43. IE Preliminary Notification, July 14, 1980.

44. IE Bulletin 80-17, "Failure of Control Rods to Insert During a BWR Scram," July 3, 1980.

45. IE Bulletin 80-17, Supplement 1, "Failure of Control Rods to Insert During a BWR Scram," July 18, 1980.

46. IE Bulletin 30-17, Supplement 2, "Failure of Control Rods to Insert During a BWR Scram," July 21, 1980.

47. IE Inspection Report 50-259/80-30, 50-260/80-23, 50-296/80-24, dated September 12, 1980.

48. "Browns Ferry Unit 3 Partial Scram Failure Event," NRC Office of AEOD report, July 25, 1980.

49. "BRW Scram Discharge System Safety Evaluation," letter from P.S. Check to G.C. Lainas, T.H. Novak, and R.L. Tedesco, dated December 1, 1980.

50. "Generic Safety Evaluation Report Regarding Integrity of BWR Scram System Piping," NUREG-0803, August 1981.

51. "Report to Congress on Abnormal Occurrences January - March 1983," NUREG-0090, Vol. 6, No. 1.

52. "Notification of Reportable Event," Georgia Power Co. to NRC (Barnes), dated -0545 EST, 08/25/82.

53. Region-II Daily Report, Hatch Unit-2, dated August 25, 1982.

54. Licensee Event Report 50-366/1982-091, Edwin I. Hatch, Georgia Power Company.

55. Licensee Event Report 50-366/1982-100, Edwin I Hatch, Georgia Power Comany.

56. "Summary of Events Surrounding Hatch-2 Scram on 8/25/82," letter from Georgia Power Company to NRC/AEOD, approximate date November 1, 1982.

57. "Case Study Report For the Edwin I. Hatch Unit-2 Plant Systems Interaction Event on August 25, 1982," NRC Office of AEOD Report AEOD/C403, May 1984.

58. IE Circular No. 78-06, "Potential Common Mode Flooding of ECCS Equipment Rooms at BWR Facilities," May 25, 1978.

59. Reference 10 of BF-3 Section.

60. "Report to Congress on Abnormal Occurrences July - September 1983," NUREG-0090, Vol. 6, No. 3.

61. "NRC Region-I Inspection Report No. 40-00672/83-01," letter to W.B. Tuffin (Nuclear Metals, Inc.), dated July 11, 1983.

62. IE Information Notice No. 83-73, "Radiation Exposure from Gloves Contaminated with Uranium Daughter Products," October 31, 1983.

63. "Report to Congress on Abnormal Occurrences July - September 1983," NUREG-0090, Vol. 6, No.3.

64. Licensee Event Reporting System Description and Guidelines for Reporting," NUREG-1022, AEOD Report, September 1983.

3. INSTITUTIONAL ARRANGEMENTS IN NON-NUCLEAR FEDERAL REGULATORY AGENCIES

The following descriptions are based on information collected during discussions with officials of various non-nuclear federal regulatory agencies, the references cited at the end of each major section, and information developed by International Energy Associates, Ltd. (IEAL), under contract to BNL.

3.1 The Federal Aviation Administration

The Federal Aviation Administration (FAA) was established by the Federal Aviation Act of 1958 (Public Law 85-726), whose preamble states its purpose to be "to provide for the regulation and promotion of civil aviation in such manner as to best foster its development and safety, and to provide for the safe and efficient use of the airspace by both civil and military aircraft..."[1] The FAA therefore has the dual role of promoting and regulating civil aviation. In that respect it is much more like the old Atomic Energy Commission, in the nuclear area, than the Nuclear Regulatory Commission, which has no promotional role.

The FAA is headed by a single Administrator, who "shall have authority and control over all personnel and activities thereof... [He] shall not submit his decisions for the approval of, nor be bound by the decisions or recommendations of any committee, board, or other organization created by Executive order."[2] His promotional role is emphasized again in Section 305 of the Act, according to which he is "empowered and directed to encourage and foster the development of civil aeronautics and air commerce in the United States and abroad." As part of this promotional role, he is authorized "to undertake or supervise such developmental work and service testing as tends to the creation of improved aircraft, aircraft engines, propellers, and appliances."[3]

The FAA is also given very wide regulatory powers. Among these is the power to regulate "the use of navigable airspace... to insure the safety of aircraft and the efficient utilization of such airspace."(4) Under this authority the FAA is directed to "prescribe air traffic rules and regulations governing the flight of aircraft, for the navigation, protection, and identification of aircraft... and for the efficient utilization of the navigable air space, including rules as to safe altitudes of flight and rules for the prevention of collision between aircraft..."(5)

The regulatory authority of the FAA is further spelled out in Title VI of the Act, <u>Safety Regulation of Civil Aeronautics</u>. Under it the Administrator may prescribe minimum standards for the design, materials, workmanship, construction, and performance of aircraft, rules and regulations and minimum standards for the inspection, servicing, and overhaul of aircraft, including the equipment and facilities used for these activities and the periods for and manner in which they are carried out, and rules and regulations governing the maximum hours or periods of service of airmen.

Title VI also gives the FAA the authority to "certificate" (or license) airmen, types of aircraft, the production of individual aircraft for which a type certificate has been issued to assure that it conforms with the conditions of the type certificate, the airworthiness of each aircraft to assure that it can be operated safely, and air carriers.

The FAA is also empowered to inspect or examine and certificate air navigation facilities, civilian flying or repair schools, and stations for the repair, maintenance, or overhaul of aircraft.

In addition to its regulatory and promotional activities, the FAA is given certain day-to-day operational responsibilities. Chief among these are the cperation and maintenance of navigational aids ("navaids") such as radars, radio and visual beacons and landing lights, communications systems, and the air traffic control system for the entire United States. It is also responsible for disseminating weather information.

Under the Airport and Airway Development Act of 1970 and the Airport and Airway Improvement Act of 1982 the FAA is authorized to disburse funds for the development and improvement of airports and airways, with the money coming from the Airport and Airway Trust Fund established by Congress.

Finally, under Title VII of the Federal Aviation Act of 1958, as amended, the FAA is empowered to participate in any investigations conducted by the National Transportation Safety Board (originally, by the Civil Aeronautics Board) but is enjoined from participating in the determination of probable cause.

The current budget of the FAA is approximately $5 billion, of which $0.75 billion is disbursed as grants-in-aid for airport and airway improvement and development. The agency employs about 45,000 people, of whom roughly 20,000 are in air traffic control.

<u>References for Section 3.1</u>

1. Federal Aviation Act of 1958 (Public Law 85-726).

2. <u>Ibid</u>, Sec.301(a).

3. <u>Ibid</u>, Sec.312(b).

4. <u>Ibid</u>, Sec.307(a).

5. <u>Ibid</u>, Sec.307(c).

3.2 National Transportation Safety Board

3.2.1 Introduction

The National Transportation Safety Board (NTSB) was established as an independent agency by the Independent Safety Board Act of 1974.[1] The Act gives it the primary responsibility for investigating, or causing to be investigated, all civil aviation accidents, as well as certain classes of accidents occurring in surface transportation (railroad, highway, marine, and pipeline). The present discussion will be limited to NTSB's aviation role, which most nearly resembles NRC's role in the nuclear area. NTSB also has certain other responsibilities of interest for this study; these will be discussed later.

NTSB investigates not only accidents - that is, events which cause deaths, injuries, or damage to aircraft or property - but failures and other occurrences that could cause an accident. In NRC parlance, these would be called incidents, events, or precursors.

The organization of the NTSB is shown in Figure 3.1. The Board consists of five members appointed by the President for five-year terms. No more than three members may be from the same political party and at least three must be technically qualified and experienced in the fields of accident reconstruction, safety engineering, human factors, transportation safety, or transportation regulation. The Chairman and Vice Chairman of the Board are designated by the President for two years. The Chairman is the chief executive officer of the Board. The staff of the Board is organized into five functional bureaus which report to The Office of Managing Director, which is responsible for the day-to-day management of the agency, and which in turn reports to the Board.

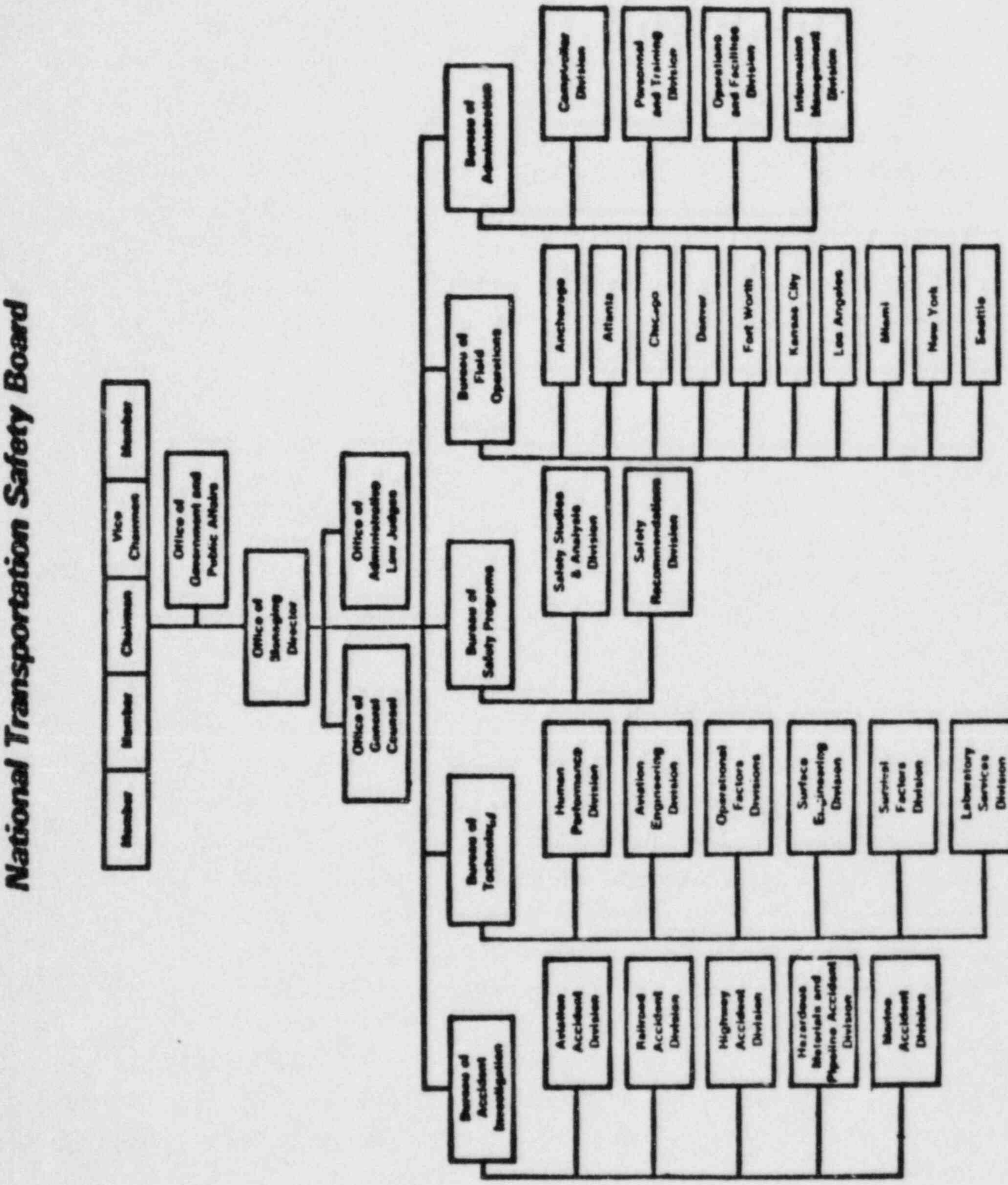

National Transportation Safety Board
Member
Member
Chairman
Vice Chairman
Member
Office of Government and Public Affairs
Office of Managing Director
Office of General Counsel
Office of Administrative Law Judges
Bureau of Accident Investigation
Bureau of Technology
Bureau of Safety Programs
Bureau of Field Operations
Bureau of Administration
Aviation Accident Division
Railroad Accident Division
Highway Accident Division
Hazardous Materials and Pipeline Accident Division
Marine Accident Division
Human Performance Division
Aviation Engineering Division
Operational Factors Divisions
Surface Engineering Division
Survival Factors Division
Laboratory Services Division
Safety Studies & Analysis Division
Safety Recommendations Division
Anchorage
Atlanta
Chicago
Denver
Fort Worth
Kansas City
Los Angeles
Miami
New York
Seattle
Comptroller Division
Personnel and Training Division
Operations and Facilities Division
Information Management Division

FIGURE 3.1

The Bureau of Accident Investigation consists of five divisions, one for each transportation mode (pipeline and hazardous material transportation are considered to be one mode). The head of a division is called its chief. The Bureau of Technology is divided into six divisions, by technical function. The Bureau of Safety Programs performs functions having to do with long-term studies, somewhat analogous to those of the Office of Analysis and Evaluation of Operational Data of NRC. The Bureau of Field Operations oversees the ten field offices of the Board, which are analogous to NRC's Regional Offices.

The rest of the bureaus and offices of the Board are concerned with legal, administrative, or public affairs matters.

3.2.2 Accident Investigations

An investigation will be triggered by a notification of an accident or incident. Operators (owners or lessees) of an aircraft are required to notify the nearest NTSB field office of any accident or incident involving their aircraft by "the most expeditious means available." The field office, which is manned 24 hours a day, immediately transmits the information to NTSB headquarters, whereupon the Director of the Bureau of Accident Investigation will decide whether to order an investigation. Sometimes the FAA will learn of an accident first, in which case its Communications Control Center will notify both NTSB headquarters and the field office in whose jurisdiction the accident occurred.

The purpose of an NTSB accident investigation is to "determine the facts, conditions, and circumstances and the cause or probable cause or causes"(1) of the accident, and to make recommendations to prevent a recurrence. Since the NTSB does not regulate (except for establishing reporting requirements for accidents), it does not involve itself in regulatory compliance issues in its conduct of the investigations.

The scope of an investigation depends on the severity or safety significance of the accident or incident, and can range from a major effort involving many people, including an on-the-scene "go-team", and directed by headquarters staff, to an investigation by a single investigator visiting the scene or even, possibly, only making telephone inquiries (a so-called "desk audit").

The type of investigation most prominently associated with the NTSB and used for the most serious events is called a "major" investigation. These usually are conducted for fatal accidents involving a commercial passenger aircraft but occasionally, also, for non-fatal but potentially dangerous incidents such as the one in 1983, in which all three engines of a Lockheed L-1011 aircraft failed during flight, although it was able to land safely.(2) Major investigations are undertaken at the direction of the Chairman.

The following description applies only to major investigations of aviation accidents or incidents. It is based on an NTSB Order(3) and on discussions with NTSB personnel. The responsibilities, procedures, and schedules for investigations are described and formalized in considerable detail in reference (3) and in NTSB Order 6200.1A, Investigation Manual for Aircraft Accidents and Incidents. It is worth noting that NTSB personnel receive special training in the conduct of investigations.

The Director of the Bureau of Accident Investigation has overall responsibility for the investigation and the scope and quality of the final report. The overall direction and technical review of the investigation and reporting process is the responsibility of the modal chief, in this case the chief of the Aviation Accident Division (see Figure 3.1).

The investigating process may be divided into four more or less distinct phases. It starts with fact-finding, in which "the facts, conditions, and circumstances" of the accident are determined. This is followed by a public hearing, in which the facts are placed on record, by a process of review and analysis to determine cause or probable cause and develop recommendations, and finally, by the writing of the report to, and its eventual adoption by, the Board.

In the first phase a "go-team" will be dispatched to the scene of the accident. The on-site investigation will involve interviews with witnesses, the recovery and examination of the wreckage, examination of records, and so on. Test, simulations, and additional interviews and examinations will be conducted off-site, both during and after the on-site investigation.

The members of the go-team are pre-assigned and listed by name in a weekly roster. The head of the team, appointed by the modal chief, is called the Investigator in Charge (IIC). The remaining members of the team consist of specialists, also appointed by the modal chief, drawn from the various technical divisions, a member of the Board (who, however, does not lead the team and whose main function is to act as public spokesman for the Agency), and a representative of the Office of Government and Public Affairs. Members of the go-team are on 24-hour alert.

Since, by law, the FAA must participate in all investigations of aircraft accidents, representatives of the FAA are always part of the on-site investigating team; in fact, there is at least one representative of the FAA on each of the groups into which the on-site team is divided (see Figure 3.2).

Extensive use is made of non-government personnel, also, in what is called the "party system," individuals or groups of individuals representing particular organizations being called

MAJOR ACCIDENT INVESTIGATION
FIELD PHASE

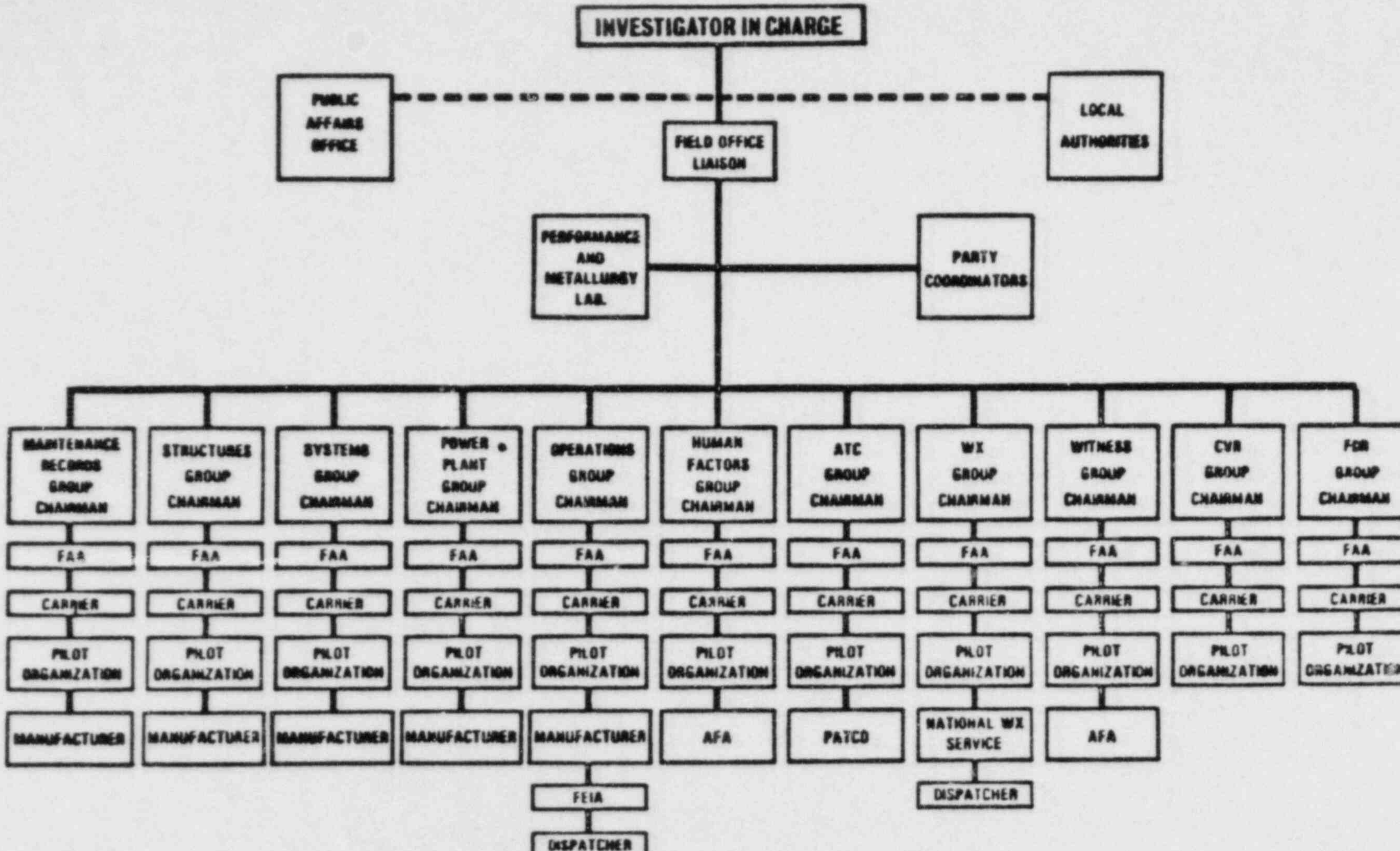


FIGURE 3.2

"parties" to the investigation. They may be sent by the carriers. the aircraft and component manufacturers and the various professional associations representing the pilots, flight engineers, mechanics, flight attendants, air traffic controllers, etc. Each party is headed by a coordinator. The NTSB has the final word as to who may be designated as a party. The only restrictions are that they have some expertise or technical knowledge to offer, and that they not be litigants. Attorneys for and representatives of insurance companies or of claimants are also excluded. However, persons interrogated during the investigation may be represented or advised by counsel. Parties tend to have an institutional continuity, keeping the same composition for long periods of time and many investigations.

The investigation team is divided up into groups, one for each technical area and each headed by an NTSB person. For example, in one investigation of a major airline accident(4) groups were established for operations, air traffic control, aircraft structures, aircraft systems, power plants, weather, human factors, witnesses, cockpit voice recorders, flight data recorder, maintenance records, aircraft performance, metallurgy, and engineering. Obviously, such an extensive investigation requires a very large team. In another recent major accident(5) the total number of people involved in the investigation was approximately 120, of whom perhaps 12-15 were from the NTSB. The organization of a typical investigation team is shown diagramatically in Figure 3.2.

Each group meets daily to summarize its activities for the day and plan those for the following day. The groups also often meet together, to encourage a free exchange of information. Most of the fact-finding is performed during this field phase. It may, however, be necessary to continue the fact-finding after the headquarters people return to Washington. If so, the required groups are reconvened there. The objective, ultimately, is to agree upon the group chairman's factual report. All the group reports are collected by the IIC, a technical review meeting of all parties is held to ensure that there is no disagreement on the facts and to determine whether additional tests are needed, and a public docket on the case is opened. Sometimes the technical review meeting is held after the public hearing. It is the goal to reach this stage in 60 days or less. At this point no determination of cause has been made.

At the conclusion of this process a public hearing is held, to place all the facts on record through testimony, depositions, and exhibits consisting of the factual material gathered in the previous phase. The hearing, which is non-adjudicatory, is presided over by a Board of Inquiry, headed by a member of the Board (see Figure 3.3). A technical panel consisting of the IIC and the relevant group chairmen from the investigative team assists in the conduct of the hearing. Parties, possibly the same ones who participated in the field investigation, are designated to testify at the hearing. Witnesses are questioned first by members of the technical panel and the Board of Inquiry, and then by the parties to the hearing. Witnesses, who testify under oath, may be accompanied, represented, or advised by counsel. Cross-examination, in the legal sense, is not permitted, however. The hearing officer has the power to issue subpoenas both to compel attendance and testimony of witnesses and the production of documents. The subject matter may not be limited to the particular accident under investigation but may be broadened at this stage to include generic issues (for example, whether the FAA surveillance program is adequate). Although the stated purpose of the hearing is to develop a complete factual record as a basis for analysis, another purpose is to give each party "its day in court." At the end of the hearing each party is encouraged to submit to the NTSB its analysis of the accident,

MAJOR ACCIDENT INVESTIGATION
PUBLIC HEARING PHASE

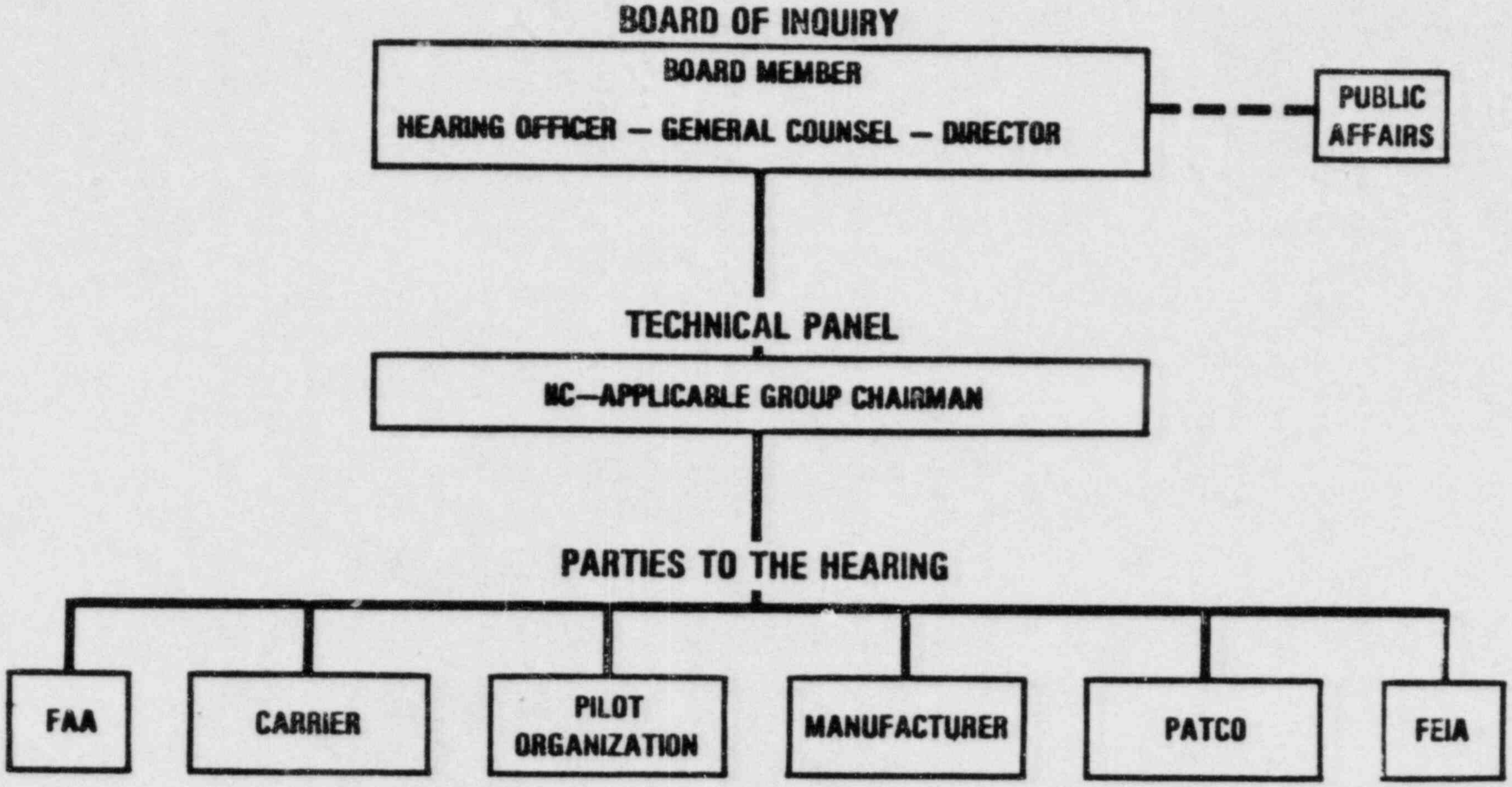


FIGURE 3.3

and its views as to the cause and what it thinks the findings and recommendations of the NTSB should be.

The record of the public hearing is available to the public but, like other reports of the Board, may not be "admitted as evidence or used in any suit or action for damages growing out of any matter mentioned in such report or reports."(1)

The analysis of the accident is performed after the completion of the hearings. This phase is not open to the public, although the results are summarized in the final report of the investigation and in more detail in material placed in the public docket. The purpose of the analysis is to establish the cause of the accident. The analysis is performed by staff specialists from the various technical divisions, the IIC, key group chairmen, etc., under the general direction of the modal chief.

At the conclusion of the analysis an initial draft report is prepared. This is the first of four drafts, each reviewed at a successively higher level in the agency, the final one being submitted to the Board. It presents the results of the fact-finding part of the investigation and of the analysis, the findings as to cause or probable cause, and recommendations to prevent a recurrence of this type of accident; it may also recommend research and development in specific areas related to the accident. These recommendations may be addressed to the FAA, the carriers, the manufacturers of the aircraft or its components, or other governmental or private organizations. In urgent cases, some recommendations may be issued almost immediately - that is, before the completion of the formal investigation - when the contributing factors are either obvious or strongly suspected and are thought to be generic.

The Board reviews the draft and may recommend changes. Usually, these are minor. Although a majority vote is required for adoption of the report, an attempt is made to obtain consensus, and most reports are adopted unanimously. Upon adoption by the Board, the report is made public.

The timetable for the various phases of the investigation is given in reference[3]. The goal is to distribute the final, printed report within 145 to 185 working days after the date of the accident, depending on the complexity of the case. A review of five major investigation reports issued during the period 1979-1983 shows an average elapsed time between the event and publication of the report of 9.8 months, with a range of 7 to 14 months. It is noteworthy that a case is never considered closed, even after the issuance of the investigation report, but may be re-opened at any time to consider significant new evidence.

For accidents less serious than those requiring a major investigation the NTSB may deploy a "full field" team, which may consist of half a dozen or so individuals, some drawn from the field office having jurisdiction over the accident and some from the Bureau of Technology of the headquarters office.[7] If necessary, personnel can be drawn from other field offices. The team is headed by an investigator-in-charge from the field office.

Accidents less severe than those requiring a full field team may be investigated by a partial field team, which, as its name implies, is smaller than the full field team but has a generally similar composition. Relatively minor accidents may be investigated by a single person from the field office having jurisdiction; these investigations are called "regular" investigations. Finally, as noted, the NTSB may delegate the investigation of certain accidents to the FAA, which determines the appropriate level of the investigation.

The joint NTSB-FAA investigations are relied upon by the FAA to support its regulatory enforcement activities; that is, the factual basis for its determination of compliance is developed in the joint investigations (except for those investigations which are delegated solely to the FAA). The FAA personnel in such investigations may ask for information related primarily to compliance issues, but if the NTSB feels that the presence of an FAA interrogator is intimidating a witness or that he is otherwise impeding the fact-finding process, he may be asked to withdraw for the duration of the questioning. This is an unusual occurrence, however, since the FAA representatives are usually technical people who specialize in investigations rather than in inspection or enforcement activities.

The coordination of the investigation and the emergency response to an accident is an important consideration, especially in the nuclear case. The NTSB does not begin its investigation till the emergency (e.g., rescue operations) is over, first because emergency response obviously has the highest priority and second, since one of the NTSB's responsibilities is to evaluate the adequacy of the response to an accident, to avoid biasing the investigation.

3.2.3 Selection Criteria for Accident Investigations

As already noted, the Transportation Safety Act of 1974 requires the NTSB to investigate or cause to be investigated all civil aviation accidents in the United States. Since the Federal Aviation Administration has the regulatory responsibility for civil aviation, it is also required to investigate all such accidents, but the NTSB is authorized to lead all investigations. The FAA may therefore investigate accidents as a participant under the direction of the NTSB, or the latter may delegate to the FAA the investigation of certain accidents or classes of accidents. In either event, the NTSB retains the responsibility for determining cause and for preparing any report that is made public, although the FAA, in its report to the NTSB, may suggest the probable cause.

The criteria used by the NTSB to decide whether to conduct the investigation itself or to assign it to the FAA are somewhat flexible. In general, the NTSB will investigate all accidents, or incidents that could potentially result in an accident, which might impair public confidence in the transportation system or involve significant or life-threatening safety issues.(6) Also, the NTSB will investigate any accident in which there is a possibility of a conflict of interest if the FAA were to investigate it - that is, any accident in which the FAA, through some failure or deficiency of its procedures, may be implicated. Aircraft accidents of the following classes will trigger NTSB investigation under the public-confidence criterion:

- Commercial passenger service
- Air traffic control operations
- Midair collisions
- Newly-certificated aircraft.
- In-flight fire
- In-flight breakup
- Turbojet aircraft

Under the significant-safety-issues criterion the following types of accidents or incidents will be investigated by the NTSB:

- Inadvertent flying into severe weather
- Instructional flying

- Light twin-engine power failure
- Fatalities as a result of powered ultralight vehicle operation

However, the definition of objective selection criteria for incidents is acknowledged to be more difficult than for accidents.

Accidents asigned to the FAA for investigations tend to be of the general aviation type, especially non-fatal ones, although the NTSB does not necessarily reserve to itself the investigation of all fatal accidents, nor does it investigate fatal accidents exclusively. Furthermore, recently the NTSB has decided to assign more fatal general aviation accidents to the FAA for investigation.

One advantage of flexible criteria (note that the public-confidence criterion is somewhat subjective) is that they permit the NTSB to adjust its investigatory work load to match its resources. The necessity for this can be appreciated by noting that there are 3000-4000 aviation accidents per year, roughly 500-800 of which are fatal.

3.2.4 Safety Studies

An important responsibility given to the NTSB by the Transportation Safety Act of 1974 is the initiation and conduct of "special studies and special investigations on matters pertaining to safety in transportation including human injury avoidance." As described in a recent NTSB report,(6)

> "Safety studies are performed to stimulate improvements in the policies, programs, activities, methods, processes, or statutory authority of Federal or State agencies, or to advance technical improvements in a transportation system, subsystem, or component, through the dissemination of a safety study report and, where appropriate, safety recommendations.

"In some cases, public hearings are held on emerging safety issues to provide an opportunity for informed public discussion. In all cases, comprehensive reports on the findings, containing corrective action recommendations, are prepared for public release.

"In selecting subjects for Safety Studies, the Board identifies ongoing or potential safety problems or issues of national significance which include one or more of the following characteristics:

- Potential for reducing accident losses.
- Potential for improving the safety effectiveness of other Government agencies.
- Potential for attaining favorable action on past Board recommendations.
- Program resources committed by other Government agencies.
- Timeliness with regard to transportation agency program planning and implementation.
- Potential impact on regulatory or other safety programs.
- Congressional and public interest.
- Can be accommodated under current personnel and scheduling limitations."

Over the years, for example, the Board has conducted studies of human performance and weather as factors contributing to accidents, of aircraft evacuation procedures, of standards for occupant protection (crashworthiness) in general aviation accidents, of in-flight collisions, and of the safety of commuter airlines. More recent subjects of studies have been alcohol and drug abuse in aviation, safety problems related to airport design, operation, and certification, and safety briefings of air passengers. In 1984 approximately 10 safety studies are expected to be completed. One recent special investigation was of the performance of the rebuilt Air Traffic Control system in the aftermath of the dismissal of more than 11,000 striking air traffic controllers in 1981.

An important technique used to identify frequent contributors to and potential causes of accidents is statistical or trend analysis of the large data base maintained by the agency.[1]

Examples of problems identified in this way are contamination of the fuel of small single-engine aircraft by water, and misfueling (fueling jet aircraft with reciprocating-engine fuel or vice versa).

Although the Board initiates most studies on its own, some have been suggested by other sources, including Congress and the public. It is hoped to increase public participation in the selection process.

At present, approximately 30 people are engaged in these studies full time. The Managing Director feels that more resources should be put into this aspect of the Board's work, because of the high potential pay-off.

3.2.5 Recommendations

Safety recommendations are issued as a product of accident investigations and safety studies. As mentioned earlier, urgent recommendations may be issued immediately upon their need becoming apparent, without waiting for the conclusion of the formal process described in Section 3.2. These usually call for immediate action on the part of the FAA to require carriers, air traffic controllers, FAA inspectors, maintenance facilities, etc., to take remedial or preventive measures without delay.

---

[1]The NTSB is the official source of accident and incident data, but under an interagency agreement it and the FAA share the data base. In addition, the FAA maintains a far larger data base, which includes the NTSB data base, to support its regulatory and operational needs. This data base, called the Aviation Safety and Analysis System, is still under development.

The NTSB does not perform a cost-benefit analysis for its recommendations although it might do some rough costing for some proposals. It does, however, use a standard of reasonableness and practicality - that is, either its recommendations are within the capabilities of present technology or it will call for the research and development necessary for their ultimate implementation; also, their cost is not likely to be so high as to be prohibitive (e.g., bankrupt the carriers).

The FAA is not required to adopt the recommendations and, at times, it has rejected them as impracticable, unnecessary, or not cost-effective. Whatever its decision, it must respond (through the Secretary of Transportation) to the recommendations in writing within 90 days after receipt. The response must include a timetable for implementation of any recommendation accepted in full or in part, and a detailed explanation of the reasons for rejecting any recommendation in full or in part. Both the Board's recommendations and the response must be published in the Federal Register. In addition, the Board, in its annual report to Congress, must summarize its recommendations for the year and the response to each.

Despite the non-binding nature of the Board's recommendations, it claims an 80% success rate in getting them adopted. According to NTSB officials, it prefers a non-mandatory system, since otherwise it might find itself in a conflict-of-interest situation in an investigation of an accident to which a Board-mandated requirement might have contributed.

3.2.6 Additional Responsibilities of NTSB

The NTSB is also charged with the responsibility of (1) evaluating the effectiveness and safety consciousness of other government agencies involved in transportation safety, (2) evaluating the safeguards used in the transportation of hazardous materials, (3) assessing and developing procedures for accident investigation, (4) appraising the accident investigation and prevention activities of other responsible government agencies, and (5) reviewing appeals from airmen and seamen whose licenses have been revoked or suspended.

Responsibilities (1)-(4) can be interpreted as giving NTSB a general oversight authority over federal agencies such as the FAA that have regulatory responsibilities in or impinging on the transportation safety area. However, since it lacks the resources to conduct such an extensive and systematic oversight (the FAA system alone would tax it), it necessarily exercises that authority with discretion, limiting it to accident investigations and special studies; the latter, especially, allow it considerable scope and flexibility in this regard.

3.2.7 Resources and Workload

The proposed FY1985 budget for the NTSB and its breakdown by organization, transportation mode, and function, in both dollars and staff years, are shown in Table 3.1.(8) The annual budget is approximately \$21 million and the total staffing, in full-time equivalents, is 320 staff years.

The workload estimates for the last three fiscal years (including the present one) are shown in Table 3.2.(8) Typically, 3500-4000 field investigations are carried out per year, but only 40, approximately, are classed as major investigations. The great majority of all accidents investigated are in aviation, but major accident investigations are roughly equally distributed among four of the five modes of transportation, including aviation (this does not necessarily mean that the major accident investigative effort is equally distributed, however; in fact, aviation accidents usually require more investigation than

Table 3.1 Allocation of NTSB Resources by Organization, Mode, and Function FY 1985(8)

	Approximate Full-Time Permanent Staff Years	Approximate Cost ($000)
I. Distribution by Organization		
Policy and Direction	38	$ 2,902
Offices of Chairman, Vice Chairman, and Members	(16)	
Office of Managing Director	(9)	
Office of Government and Public Affairs	(6)	
Office of General Counsel	(7)	
Accident Investigation	153	9,375
Technology	69	4,310
Safety Programs	23	1,300
Administration	28	2,252
Office of Administrative Law Judges	9	706
TOTAL	320	$20,845
II. Distribution by Transportation Mode		
Intermodal	139	$ 9,054
Aviation	115	7,491
Railroad	20	1,303
Highway	26	1,694
Marine	14	912
Pipeline	2	130
Hazardous Materials	4	261
TOTAL	320	$20,845
III. Distribution by Function		
Major Accident Investigations	135	$ 8,794
Field Accident Investigations	112	7,296
Safety Studies	17	1,107
Safety Objectives	4	261
Rulemaking Reviews	4	261
Appeals	12	781
Administrative Support	36	2,345
TOTAL	320	$20,845

Table 3.2 NTSB Workload Estimates(8)

Workload Measures:	FY1983	FY1984	FY1985
Safety Recommendations Issued	436	450	443
Major Accident Investigation Reports	37	44	40
Aviation	(10)	(11)	(11)
Railroad	(10)	(10)	(10)
Highway	(5)	(8)	(6)
Marine	(9)	(11)	(10)
Hazardous Materials/Pipeline	(3)	(4)	(3)
Field Accident Investigation Reports	4,828*	3,840	3,575
Aviation	(4,300)*	(3,500)	(3,300)
Railroad	(458)*	(200)	(175)
Highway	(70)	(140)	(100)
Foreign Investigations	49	54	51
Public Hearings	11	26	26
Safety Studies	5	11	8
Rulemaking Reviews	46	54	54
Certificate and License Appeals - Closed	474	665	575

*The number of reports completed is unusually high as a result of a special effort to eliminate a backlog of uncompleted reports from prior years.

surface transportation accidents). Many of the non-major accident investigations are carried out by telephone or by the dispatch of a single investigator to the site. It should also be kept in mind that many of the investigations, especially of general-aviation accidents, are carried out by the FAA, under delegation by the NTSB; however, all FAA investigation reports are reviewed by the NTSB.

The workload expended on aviation investigations can be estimated on the basis of data supplied by NTSB. In calendar year 1983 there were 1051 full field investigation reports and 2292 "limited" (i.e., less than full field) investigation reports. The average effort for these is estimated as 64 and 28 staff-hours each, or a total of 37 and 36 staff-years, respectively. From Table 3.2, approximately 10 major aviation accidents occur each year. NTSB estimates the technical effort expended on each investigation, including the writing of the report, at 3 staff-years. The total effort for the major aviation investigation is then ∿30 staff-years per year, and the total aviation investigation effort of the NTSB is ∿100 staff-years per year. Since aviation personnel have other duties besides accident investigation, this is in rough agreement with the aviation staffing figures in Table 3.1. It is interesting to note that the effort expended on aviation investigations is roughly the same for all three broad significance categories.

The budget figures do not reflect the total resources actually available to the NTSB for the conduct of investigations. As already noted, the party system allows, in effect, as much as a 10-fold expansion of the manpower available for the investigation of a major accident. Also, during such investigations many services are donated by companies and local and federal governmental agencies. Aircraft manufacturers may perform complex calculations and flight simulations for the NTSB on equipment that the latter could not afford to acquire or maintain. In addition to conducting delegated investigations without charge to the NTSB, the FAA will do computer searches and pay for autopsies of accident victims. One of the most expensive activities would ordinarily be recovery of the accident vehicle (e.g., of the Air Florida plane from the Potomac River), but often crane service is donated and free hangar space is provided for the wreckage. Tests which the NTSB or FAA is unable to do may be performed by other government agencies, such as the National Bureau of Standards, on a cost-reimbursable basis, as appropriate.

Outside consultants account for an insignificant portion of the budget. The largest consulting contract in the last three years was for $150,000 for a computer analysis by a university engineering department of the collapse of the I-95 bridge in Connecticut. This type of contract is rare, however.

3.2.8 Views on Effectiveness of NTSB System

To obtain a wide spectrum of views on the operation of the NTSB-FAA system, BNL interviewed representatives of the aviation industry (three major carriers and two major airframe manufacturers), professional associations (the Airline Pilots Association [ALPA] and the Association of Flight Attendants [AFA]), and a consumers organization (Aviation Consumers Action Project [ACAP]). All except the representative of ACAP have been involved as parties in major accident investigations, and most have had many years of experience in this area.

Considering the wide range of special interests of the interviewees, their overall appraisal of the NTSB was remarkably uniform. With a single exception, they rated it very good to excellent. The exception (the representative of one of the carriers) stated that five years ago his rating of the Agency would have been excellent, but that in recent years, as a result of a politicization of the Board, it had become an "abomination". However, he specifically exempted the Agency's career personnel, whom he regarded as very professional, from this condemnation. Further, he considered the fact-finding phase of investigations to be satisfactory but the conclusions untrustworthy because of the intrusion of political factors.

With this exception, most of the criticisms of the NTSB were rather mild and limited in scope, and very few, if any, were subscribed to by a majority of the interviewees. The propositions for change that attracted the widest support were that (1) all Board members should be required to have technical qualifications (for: two carriers, one manufacturer, and ALPA; against: one manufacturer, AFA, and ACAP), and (2) the analysis phase of investigations should be, in some form, open to the parties (for: one manufacturer, one carrier, and ALPA; against: one manufacturer).

All interviewees praised the party system of investigating accidents. The general view was that, given the wide range of expertise required to investigate most major aircraft accidents and the difficulty of attracting and maintaining such expertise in a government agency, there was no suitable alternative; also, that a combination of two factors effectively counteracted any influences that might arise from the apparent conflict of interest inherent in the party system: the emotional experience of being at the scene of a major disaster, which one of the interviewees likened to "a religious experience," and the different special interests of the various parties, which tended to cancel each other. The AFA representative, who had previously worked for ACAP, said that when he first got into the aviation area, having come from "a Nader establishment" he was very skeptical about any system of investigation that depended on industry people, but system of investigation that depended on industry people, but now, after five years of actual experience (including participation in investigations as a party), he had come to have a "glowing" opinion of the NTSB and felt that its investigations really do get to the bottom of accidents. His main criticism of the process was that it was too prone to blame accidents on pilot error. (This criticism was also made by ALPA.)

Those who preferred the present make-up of the Board felt that appointees from outside the field of transportation safety could bring a fresh perspective to the subject, and that a political background was useful in dealing with the media and the public (that is, that the non-technical appointees were often more adept at public relations). On the other hand, those favoring an all-technical Board complained of public posturing and rhetoric by the non-technical members and their lack of understanding of technical issues which sometimes caused them to jump to unwarranted conclusions.

Sources favoring party participation in the analysis of an accident did not necessarily insist on a full-fledged role (e.g., as at the public hearing in the fact-finding phase), but felt that there should at least be an opportunity to review the draft report and argue its conclusions in meetings with the staff or in a brief appearance before the Board. Those opposed to widening participation in the analysis felt that it would unnecessarily protract the investigation and introduce an adversarial spirit into the proceedings.

The issue of technical competence is relevant to the nuclear area, since one of the most widespread objections to establishing a separate agency for nuclear investigations is that it would seriously dilute the already small pool of people with direct operational experience. Several of the interviewers felt that although many of the NTSB staff were professionally competent, many were not. It is not clear to what extent they thought this affected the outcome of investigations. However, the party system would tend to compensate for technical shortcomings of the NTSB staff, at least in the fact-finding phase.

Somewhat related to this issue was a complaint that sometimes there is a lack of continuity in the NTSB investigation teams, in both the IIC and the subordinate members. Consequently, at each investigation some members of the team have to be re-educated on the characteristics of the aircraft involved in the accident. It was suggested that only teams expert in the relevant type of aircraft be sent on an investigation.

Another criticism was that sometimes the accident reports take too long, weakening the usefulness of the recommendations; on the other hand, one source felt that the investigations themselves are sometimes too hastily conducted, causing some facts to be overlooked.

The implementation of the recommendations of accident investigations was considered by both AFA and ACAP to take too long, sometimes; this is encouraged, it was felt, by the non-specific or "open-ended" nature of some of the recommendations. Three examples were recommendations for using safer materials (i.e., less toxic when burning or less combustible) in cabin interiors than the present ones, investigating the use of de-icing fluids, and installing smoke detectors in lavatories.

The special safety studies undertaken by NTSB were generally regarded as useful. However, the ALPA spokesman considered some of them to be too cursory.

Listing all these scattered criticisms may give them undue weight. What is notable is that virtually all parties agreed that

- the NTSB accident investigations are generally fair, objective, and effective,
- the party system works very well and there is no satisfactory alternative,
- the NTSB does not hesitate to criticize the FAA when such criticism is deserved (some parties felt that, in fact, it was sometimes too harsh in that regard), and
- the FAA is much more adversarial than the NTSB in investigations and more prone to concentrate on regulatory infractions than on fact-finding to determine cause.

References for Section 3.2

1. The Independent Safety Board Act of 1974 (Title III of the Transportation Safety Act of 1974 (Public Law 93-633)).

2. NTSB/AAR-84/04, Aircraft Accident Report-Eastern Airlines, Inc., Lockheed L-1011, N334EA, Miami International Airport, Miami, Florida, May 5, 1983, National Transportation Safety Board Report, March 9, 1984.

3. NTSB Order 6200.4, Major Transportation Accident/Incident Investigation and Report Preparation, National Transportation Safety Board, Sept. 8, 1982.

4. NTSB-AAR-79-17, Aircraft Accident Report-American Airlines, Inc., DC-10-10, N110AA, Chicago-O'Hare International Airport, Chicago, Illinois, May 25, 1979, National Transportation Safety Board Report, Dec. 21, 1979.

5. NTSB-AAR-82-8, Aircraft Accident Report-Air Florida, Inc., Boeing 737-222, N62AF, Collision with 14th Street Bridge, Near Washington National Airport, Washington, D.C., January 13, 1982, National Transportation Safety Board Report, Aug. 10, 1982.

6. Annual Report to Congress, 1983, National Transportation Safety Board.

7. OMB-Directed Study of Field Investigation Practices, National Transportation Safety Board, Oct. 16, 1981.

8. Fiscal Year 1985 Budget, National Transportation Safety Board.

3.3 Accident/Incident Investigation Procedures in Other Regulatory Agencies

A number of other federal agencies involved with regulating activities that from time-to-time result in accidents and incidents that cause loss of life or at least have that potential were briefly surveyed for applicability to this analysis. A review of the summaries of these various agencies and how they handle accidents and incidents yields the conclusion that there is currently nothing similar to the National Transportation Safety Board (NTSB) in the federal government. Most agencies handle accident investigations in one of three ways: (1) through an established line office within the agency that has such responsibility, (2) through an *ad hoc* task force set up within the agency to investigate the accident and prepare a report, or (3) through an established staff-level office (e.g., an Inspector General), which may have some autonomy from the line organization but is not independent from the agency within which it is located.

The following summaries present general background and inspection methodologies of the other six federal agencies examined during the preparation of this analysis.

3.3.1 Environmental Protection Agency (EPA)

Background

The Environmental Protection Agency (EPA) had its origins in the National Environmental Policy Act of 1969 (NEPA). Title I of the Act sets forth national environmental policy; Title II established the Council on Environmental Quality, which reviews all federal and state environmental programs, conducts studies, watches environmental trends, etc., and serves ultimately in an advisory capacity to the President. In 1970, through Title 3, Reorganization Plan No. 3, the President established EPA as an Executive agency by transferring powers and responsibilities from numerous other agencies (e.g., CEQ, the Atomic Energy Commission, the Department of Health, Education and Welfare, and the Department of Agriculture).

Handling Of Investigations

EPA has three general investigative offices. Within the Office of the Inspector General is the Office of Investigations, which deals primarily with employee/employer fraud and other types of criminal investigation. The Office of Enforcement and Compliance Monitoring performs routine inspection, monitoring, and evaluation of violations of EPA regulations. Most investigations are performed at the Regional Office level. Those cases that are serious enough to warrant it may be performed by the National Enforcement Investigation Center in Denver, Colorado.

Issuance of citations and penalties and other enforcement procedures, including review of cases, is also handled within EPA. However, appeals and other legislative actions are referred outside of EPA to the Department of Justice.

In addition to the more routine inspections performed through the Office of Enforcement and Compliance Monitoring, EPA provides for an investigative function dedicated to emergency incidents. The Office of Emergency and Remedial Response, under the Office of Solid Waste and Emergency Response, was originally empowered by the Clean Water Act of 1972 to deal primarily with oil spills, but its authority was greatly increased by the passage of theComprehensive Environmental Response, Compensation, and Liability Act of 1980. Although the office works through EPA Field Offices, it also has special response personnel (On-Scene Coordinators).

Independent Investigative Bodies

None

3.3.2 Mine Safety and Health Administration (MSHA)

Background

The Mine Safety and Health Administration (MSHA) was established by the Federal Mine Safety and Health Amendments Act of 1977. (The original Act was the Federal Coal Mine Health and Safety Act of 1969.) An agency within the Department of Labor, MSHA is responsible for protecting the health and safety of employees at mines and associated operations. It issues regulations, provides safety programs and training, makes inspections of operations, issues citations and penalties, and performs assessments of investigations.

Handling Of Investigations

Inspection responsibilities lie within MSHA's Office of Technical Compliance and Investigation (coal mines) and Office of Metal and Nonmetal Safety and Health (metal and nonmetal mines), although actual inspections are performed primarily at the District, Subdistrict, and Field Office levels. Of the approximately 100,000 inspections performed by MSHA in FY 1980, most were routine, scheduled inspections. Like other government agencies, MSHA emphasizes preventive inspection, as is evidenced in its Resident Inspection Program, under which mines are assigned a full-time inspector who both makes inspections and is available for consultation.

The 1977 Act empowers MSHA to assess penalties for safety and health violations. These responsibilities lie in the Office of Assessments. If an inspection results in a citation or assessment, the operator has 10 days to ask for a conference with the inspector. More than 80% of the cases are settled at this level. However, the operator may appeal to the Mine Safety and Health Review Commission. This Commission, also created by the 1977 Act, is an independent adjudicatory body whose main purpose is to resolve enforcement disputes between MSHA and mine operators. The commission is comprised of five Presidentially appointed Commissioners and a varying number of Administrative Law Judges. If an operator, after going through the commission appeal and review process, is still dissatisfied with the final ruling, he may then appeal his case to a U.S. Circuit Court.

Like routine inspections, responsibility for emergency response investigations lies with the Office of Technical Compliance and Investigation and the Office of Metal and Nonmetal Safety and Health. In the event of an emergency, these offices identify specially qualified investigators among the field staff and assemble a special investigative task force for the incident. Although oversight/coordination of an emergency situation remains with the Headquarters offices, it may enlist the support of the Office of Technical Support, Division of Mine Emergency, to provide onsite technical support and equipment for rescue operations.

Independent Investigative Bodies

None

3.3.3 Food and Drug Administration (FDA)

Background

The origins of the Food and Drug Administration (FDA) lie in the Food and Drug Act of 1906, which assigned FDA-like functions to several government agencies. The Agricultural Appropriation

Act of 1931 unified these functions into the FDA, which it placed within the Department of Health and Human Services. Its general purpose is to protect the health of the nation against impure and unsafe foods, drugs, and other similar potential hazards, which it carries out by performing pre-market clearances, monitoring activities (e.g., inspections, investigations, and surveillance), and compliance activities (e.g., correction and penalty).

Handling Of Investigations

Like other government agencies, many of FDA's monitoring activities are preventive in nature. During FYs 1980 through 1982, FDA conducted over 100,000 inspections, many of which were performed to ensure compliance, rather than as a result of an incident. Headquarters responsibility for inspection and other monitoring activities falls under the Office of Regional Operations, which was restructured in April 1983 on a trial basis. The proposed new office includes: the Office of Regional Operations, which provides management coordination of field activities, including field inspections and emergency operations; the Office of Enforcement, which monitors compliance activities and reviews legal actions; and the Office of Regulatory Resource Management, which acts as liaison with other government agencies and provides field support functions. From this level, field monitoring activities move down through Regional Offices, District Offices, Station Offices, and Resident Posts. Twenty-one District Offices perform the bulk of FDA's field work, including the majority of investigations and compliance reviews.

Like inspections, compliance reviews and enforcement recommendations are performed primarily at the District Office level. Cases can be appealed to the Office of the Administrative Law Judge, who will issue an initial decision. The decision rendered there becomes the final decision of the agency if, within a specified time, it is not further appealed to the Commissioner.

During an emergency incident, primary responsibility for monitoring information and coordinating agency response rests with the Division of Emergency and Epidemiological Investigations, which is also under the Office of Regional Operations. In addition, the Commissioner may establish an Emergency Coordination Center or Emergency Task Force to deal with a crisis more directly at the Headquarters level.

Independent Investigative Bodies

None

3.3.4 Consumer Product Safety Commission (CPSC)

Background

The Consumer Product Safety Commission (CPSC) is an independent federal regulatory agency. It is headed by five Commissioners, appointed by the President with the consent of Congress, who report both to the President and to Congress. The CPSC was established in 1972 by the Consumer Product Safety Act (CPSA), but its authority has increased with the passage of subsequent Acts. Its primary purposes are to protect the public against injury from consumer products, to assist consumers evaluate consumer products, to develop safety standards, and to perform research and investigations into causes and prevention of product-related deaths, illnesses, and injuries. Congress has excluded from its responsibilities specific products that are regulated by other agencies (e.g., FDA, EPA, and DOT).

Handling Of Investigations

Like other government agencies, CPSC takes a preventive approach toward safety. It expends great effort on promoting consumer and industry programs and activities to foster voluntary product safety standards and compliance, but it also sets and enforces mandatory standards and compliance. During FY 1982, CPSC conducted 1,796 inspections (routine monitoring), 1,083 sample collections, 3,046 investigations (in-depth studies of non-compliance), and 1,275 recall checks, which were performed primarily by inspectors out of the five Regional Offices and the 27 Resident Posts.

In non-compliance cases, inspectors may make recommendations or provide consultation for corrective action, but compliance enforcement is the responsibility of the Directorate for Compliance Administration Litigation (DCAL) and begins when the office is notified by an inspector. Most non-compliance cases are settled at the DCAL level. However, if no settlement is reached, DCAL's attorneys present the case to the Commissioners, who issue the final CPSC ruling. If dissatisfied with the ruling, the individual or manufacturer may appeal further to a U.S. District Court.

CPSC has no special office and few provisions for handling emergency situations. Field inspectors follow standard inspection procedures and then report the incident to DCAL. To act most expeditiously, DCAL may elect to side-step the in-house litigation process, under Section 12 of the CPSA, and appeal directly to a District Court for action (e.g., issuance of a search warrant or an injunction against a manufacturer).

Independent Investigative Bodies

None

3.3.5 Occupational Safety and Health Administration (OSHA)

Background

Under the Occupational Safety and Health Act of 1970, Section 8a, the Occupational Safety and Health Administration (OSHA) is authorized to carry out inspections and investigations of establishments, construction sites, etc., where there may be any concern regarding employee health or safety. OSHA is also empowered by the Act to establish safety and health standards, to provide enforcement of standards, to issue citations and penalties, and to provide reporting procedures for results of inspections, tests, monitoring, etc.

As OSHA is authorized to delegate these duties as it sees fit, much of OSHA's work is being done at the state level. After a state has submitted to OSHA and received approval of an Occupational Safety and Health State Plan, the state can conduct and control inspections, monitoring, enforcement, etc., thus serving as an extension of OSHA.

Handling Of Investigations

In recent years, OSHA has made a major push to channel its resources into accident prevention. Most of its programs are aimed to this end (e.g., training, consultation, and incentive programs). Most inspections are preventive (i.e., pre-incident) in nature. During 1983, 40% of OSHA's resources were dedicated to federal inspection activities. Of the 68,917 federal inspections conducted that year, 59,205 (86%) were routine, scheduled inspections; 6,690 (10%) were in response to complaints; and 1,411 (2%) resulted from fatalities or catastrophes. The remaining 1,611 (2%) were follow-up visits.

OSHA inspections and investigations are conducted by Compliance Safety and Health Officers out of the approximately 90 Area Offices. These offices report to one of 10 Regional Offices, which, under the organization of OSHA, fall under the jurisdiction of the Directorate of Field Operations.

If an inspection results in the issuance of a citation, the employee may appeal to the Occupational Safety and Health Review Commission (OSHRC), an independent adjudicatory body also established by the Occupational Safety and Health Act of 1970. If dissatisfied with OSHRC's ruling, an employee can appeal further to a U.S. Circuit Court.

OSHA has no special office or provisions for dealing with emergencies. All inspections, including emergency situations, are handled through the Directorate of Field Operations. Although inspectors operate at the Area Office level, the extent to which higher level administrative personnel become involved is determined by inspection results or the seriousness of an incident.

Independent Investigative Bodies

None

3.3.6 U.S. Department of Agriculture (USDA)

Background

The U.S. Department of Agriculture was created by an act of Congress in 1862 and was originally administered by the Commissioner of Agriculture. In 1889, the department, whose powers and duties were expanded, became an Executive department, and the Commissioner became the Secretary of Agriculture.

Handling Of Investigations

The Office of the Inspector General serves an investigatory function within USDA, although it deals primarily with fraud, discrimination, employee complaints, and other types of criminal investigations.

Responsibility for regulatory compliance inspections falls under the Assistant Secretary of Marketing and Inspection Services. Although the office performs other tasks, including other monitoring-type functions, primary inspection responsibilities are concentrated into three divisions: the Animal and Plant Health Inspection Service; the Federal Grain Inspection Service; and the Food Safety and Inspection Service. As with other government agencies, USDA's emphasis for inspections, performed through a complex field network, is preventive: grading, classifying, testing, and other types of quality assurance and standardization activities. This office also oversees numerous special inspection, compliance, and control (e.g., quarantine) programs, often in cooperation with states, organizations, and individuals.

Because of the size and complexity of USDA, the compliance process is multi-leveled. An inspector has authority to take certain steps toward compliance (e.g., condemn products, or stop production), but most action is taken in the Office of Compliance, which is also under the Office of Marketing and Inspection Services. Depending on the seriousness of the case, it can go beyond this level within USDA to involve the Judicial Officer (who serves as the final deciding officer, in place of the Secretary, in regulatory proceedings and hearings), the Office of General Counsel (the principal legal advisors to the Secretary), and the Office of Administrative Law Judges (an autonomous, quasi-judicial body). If dissatisfied with the final decision of the agency, an individual can then appeal to a U.S. Circuit Court.

Within USDA, responsibility for performing emergency investigations (e.g., a grain elevator explosion) also lies within the Office of Marketing and Inspection. Depending on the seriousness of an incident, the office may assemble a special investigative team or request support from the Office of the Inspector General.

Independent Investigative Bodies

None

4. INDEPENDENT SAFETY ORGANIZATION (ISO)

4.1 Need for an ISO

To determine the need for an Independent Safety Organization (ISO) to investigate significant safety events at NRC-licensed facilities, this study examined a number of significant events which have occurred since the Three Mile Island-2 event. In addition, the BNL Task Force interviewed a spectrum of individuals associated with the nuclear industry and knowledgeable about operational event investigations. Their views and perceptions have contributed to the assessment of need for an ISO.

Finally, the philosophy and operating practices of the FAA and NTSB with respect to accident investigation were studied to determine their relevance and applicability to the nuclear industry.

The BNL study did not find any indication of bias in the NRC investigations that were examined. However, the potential for a conflict of interest due to some action or inaction of the NRC contributing to an accident and the potential for concentrating on regulatory compliance rather than determination of cause during an investigation is sufficient, in our judgment, to justify a greater independence of the investigating body from the licensing, regulatory, and enforcement arms of the NRC. It was precisely this potential conflict of interest that led Congress, in 1935, to establish the progenitor of the National Transportation Safety Board as a quasi-independent investigative agency.

A study of representative significant events by the BNL Task Force, as well as the interviews conducted with the spectrum of individuals from the nuclear industry and the public, indicated that significant events were in general investigated in a professional and competent manner, with some exceptions, by the various offices of the NRC, INPO, and the utilities. The causes of most significant events were determined in a timely manner and recommendations to prevent their recurrence were developed. However, there was one event (Salem-1) among the limited number studied in which the ultimate cause of failure appears not to have been determined because of poor investigation procedures, as well as a second event, (Hatch2), whose significance was not identified or recognized in a timely manner. The BNL Task Force has identified below a number of desirable improvements in the present procedures for the investigation of operational events, based on a consensus of a number of interviews, as well as the review of selected events and the judgment of the Task Force. Some or all of these improvements could, in principle, be achieved within the present organizational structure. It is, however, our judgment that most of them could be more easily attained with a new safety organization devoted primarily to the investigation and determination of cause of significant events and independent of the regulatory and enforcement arms of the NRC.

a) There is need for a more structured and coordinated investigation focused on the determination of cause of a significant event by all interested parties, including the various NRC offices, INPO, utilities and vendors.

It is the Task Force's perception, and also that of the utilities, that currently, following a significant event, too many independent investigations are carried out by the various NRC offices (I&E, Regions, NRR, AEOD), INPO, EPRI/NSAC, utility, and vendors. These investigations tend to overlap and interfere and make fact finding and the determination of cause difficult, as observed in the Salem-1 investigation. A single well-organized investigation focusing on the determination of cause would provide a more efficient and thorough fact finding and timely input to required NRC, licensee, INPO, and vendor evaluations, while at the same time providing the factual basis for regulatory and enforcement actions. This need is coupled with the need for a clear definition of organizational responsibility for the investigation and determination of cause.

b) There is need to "freeze" the plant conditions and personnel, if practicable from the safety point of view, as soon as possible after a significant event (SE) in order to be able to recreate the event accurately and determine the probable cause in an investigation.

This necessity to preserve the evidence must be imparted forcefully to all concerned with an event under investigation. If too much time passes before an investigation is initiated, the memories of operating personnel begin to fade and plant components may be changed or altered (e.g., the Salem-1 event). The investigation of a significant event must start as soon as possible after its occurrence. It is recognized that freezing plant conditions may cause undue economic hardship; therefore, careful judgment would be required in the application of a freezing criterion to only those significant events which require full field investigation.

c) There is need to separate fact-finding from searches for violations of rules or regulations to minimize the potential for an adversarial atmosphere in an investigation.

In event investigations it is perceived by the utilities, whose cooperation is needed, that the NRC investigators conduct the investigation on an adversarial basis. Searching for regulatory violations possibly punishable with fines while trying to establish the facts of an event does not produce an atmosphere conducive to the latter, but, on the contrary, is apt to have a chilling effect. Logically, the fact finding should start first. However, the present responsibility for investigation by the regulatory and enforcement arms of the NRC tends to work against the fact finding goal.

d) There is need for investigators with more operating experience, appropriate practical technical expertise, and more training in conducting investigations.

Given the difficulty of competing with the industry for people with operating experience, and the difficulty of maintaining that qualification in government service, it would appear to be desirable to emulate the NTSB party system for conducting investigations. This would enable the investigative body to make use of highly qualified personnel from the utility and the reactor manufacturer to help with the investigations.

e) There is need to improve the ability to identify significant events.

The present NRC staffing for resident inspection does not seem to be adequate to detect all such incidents or, sometimes, to understand their full safety significance (e.g., Hatch-2). Partly this is because there are too few resident inspectors to be present at all times, and partly because the resident inspectors have too many varied responsibilities to examine an event that is not obviously significant to the necessary depth to make a determination. This situation could be alleviated by adopting the system of designated representatives at utilities similar to the one used by the FAA at aircraft manufacturers as an essential part of its certification programs.

f) There is need to improve the timeliness of the issuance and implementation of recommendations from an investigation.

There have been criticisms that the issuance and implementation (e.g., Hatch-2) of requirements for safety improvements following an investigation sometimes take too long, and that the reasons for rejecting recommendations are sometimes not made public. This situation could be improved by a system of public recommendations requiring a public response within some time limit. (The present procedures call for a written response to AEOD recommendations, but these are not widely disseminated, as are the responses of the FAA to NTSB recommendations, both of which are published in the Federal Register.)

g) It is desirable for an office such as AEOD to develop relationships with utilities outside the regulatory framework to obtain additional operational data.

In the original concept for AEOD, it was proposed that one of its responsibilities was to accumulate and evaluate operational data, especially for use in determining reliability of systems and components for probabilistic risk assessment. The responsibility for the compilation of reliability data has currently been given to INPO, which has taken over the Nuclear Plant Reliability Data System (NPRDS). After a relatively slow start NPRDS, a voluntary utility reporting program, is beginning to receive data on component and system failures from the utilities. Although the AEOD is committed to analyze NPRDS data as part of its trends and patterns analysis, there is need to evaluate the NPRDS data in conjunction with operational data to develop useful component and system reliability data for PRA. Sometimes it is difficult to obtain operational data such as length of operation of components, and current component and system data needed for reliability analysis.

Although these improvements could be made in the procedures and practices of the present organization, it is believed that they would be more likely to be implemented with a single independent safety organization whose primary responsibility would be the conduct of investigations into significant events, the determination of cause, and formulation of recommendations to prevent their recurrence, and which did not have regulatory, licensing, or enforcement responsibilities. It is believed that such an agency would enjoy greater public confidence than the present arrangement, even if the latter were improved along the lines suggested here but not made independent in the sense just defined, because the potential for a conflict of interest would still exist.

4.2 Comparison Between Nuclear and Aviation Industries

The extent to which an NTSB-like approach can be adopted for the investigation of nuclear events depends on the degree of similarity between the aviation and nuclear industries. A discussion of the similarities and differences between the two industries is given below.

Similarities

a) Both industries use high technology and sophisticated equipment.

b) Both industries depend upon instrumentation and interpretation of instrument readings for safe operation.

c) Both industries are commercial ones providing services to the general public.

d) Both industries are regulated by federal agencies and operate under government licenses. In both cases the operators are not the designers and the constructors of the systems they operate. The ultimate responsibility for safe operation rests with the operator: the airline or the utility.

e) In both industries large capital costs require maintaining a high level of utilization of the equipment (plants or aircraft) for commercial success.

f) There is high public interest in and media attention to significant operational events or accidents in both the aviation and nuclear industries. A safety problem for one operator will in general affect other operators.

Differences

a) Although both industries require a high level of utilization of equipment, commercial nuclear plants require a much larger capital investment than commercial jet aircraft (~$0.5B - $4B per nuclear plant, and $10M - $60M per plane). Because of the significantly larger capital cost, there is greater urgency to get a nuclear plant back on line after an event. Replacement power costs alone could exceed $1M per day for a large 1000-MW plant.

b) It is not possible to shut down a nuclear power plant completely, as it is an aircraft. Since the decay heat produced even after a plant has attained cold shutdown may be considerable, there is a continuing need to operate heat removal systems. This may require rapid repair or replacement of components or systems after an event which may in turn preclude the "freezing" of equipment and personnel for an investigation. On the other hand, after a significant event an aircraft may not be in a condition to be returned to service at all, or it may require major repairs, or even if still intact, it can be safely shut down. Therefore, it is always possible to "freeze" equipment and operating personnel to investigate an aviation event.

c) In the commercial airline industry there have been about 1400 fatalities in 238 accidents in scheduled airline service over the past 10 years, and about 300 fatalities in 353 accidents in commuter air service during the same period. In the commercial nuclear power industry there have been no fatalities involving the general public and only one significant event (Three Mile Island Unit 2 [TMI-2]) which resulted in major damage to the facility, during the same 10-year period.

One of the reasons for the difference in public attitudes toward nuclear and aviation events is that an aircraft accident, even with a number of fatalities, rapidly disappears from the headlines and ceases to be a public issue. On the other hand, after a nuclear power plant event, especially one that results in shutdown of the plant for some period of time, there are frequent headlines on the hearings for restart, and discussions regarding emergency planning, siren testing and drills, all of which help to maintain the issue before the public.

d) In the aviation industry there are approximately 2500 commercial (scheduled and commuter airlines) aircraft and 250,000 general aviation aircraft in operation, whereas there are only 129 nuclear plants either operating or under construction (85 had operating licenses as of December 1984). The NTSB estimates that in 1984 there will be about 3500 field accident investigations, of which about 10-11 will be major accident investigations involving significant fatalities. In the nuclear industry in 1984 it is estimated that there will be about 2200 licensee event reports, of which perhaps 70-140 will have some significance and about 10 of these will be considered abnormal occurrences. It should be recognized that there is a major difference between the aviation events and the nuclear operational events in that the estimated 8-10 abnormal occurrences per year at nuclear power plants will in all probability require only some component or system repair and involve little or no fuel damage or release of radioactivity, and no fatalities or injury to the public. The abnormal occurrences and the 70-140 LERs having some significance would be studied primarily as possible precursors to more serious events.

e) The philosophy of design of equipment is significantly different in the two industries. A nuclear power plant is significantly more complex than a modern jet aircraft. The nuclear components and systems are more rugged and can stand greater abuse than aircraft components and systems. A single nuclear plant has more than 25,000 components (line-replaceable units), whereas an aircraft has at most 5000 to 6000. There are more redundant safety features in a nuclear plant than in an aircraft. There is greater routine dependency upon the pilot of an aircraft than on an operator of a nuclear plant for safe operation. Because of weight considerations, there is greater need to balance the design and redundancy of safety systems with economics in the design of an aircraft than of a nuclear plant.

f) There is a fundamental difference between the agencies regulating the two industries. In the aviation industry the FAA was established "to provide for the regulation and promotion of civil aviation in such a manner as to best foster its development and safety". On the other hand, the NRC was established solely to regulate the nuclear industry.

g) There are significant differences in the extent of involvement of the regulatory agencies of the two industries in actual operations. In the aviation industry the FAA operates air navigational aids and the air traffic control (ATC) system, which controls the flight routes and patterns of commercial aviation. It also disseminates weather information. It may, therefore, be directly responsible for an aircraft event or accident. In the nuclear industry the NRC is not directly involved in the routine operation of a plant. During an emergency, although the licensee has direct responsibility for safe shutdown of the facility, the NRC may become involved and may be indirectly responsible for an event through its advisories. The FAA is, therefore, more likely to be culpable in an accident or event than the NRC, and consequently the need for a totally independent investigation (independent from the regulatory agency) is more compelling in the aviation than in the nuclear industry.

h) In aviation, a significant event is rather obvious because the aircraft is damaged or destroyed, or operational errors may be obvious to witnesses. The Air Traffic Control (ATC) system would also detect many abnormal occurrences. In the nuclear industry the NRC depends on the utility to identify an unusual event at a nuclear power plant, unless the NRC Resident Inspector happens to be in the control room at the time of the event. In almost all cases the utility operating staff would have the responsibility not only for the identification of the event but its significance. Events may occur whose significance could be overlooked because of inadequate reporting or description. For example, the precursor to the TMI-2 accident was not identified as a significant event by the utility. Other examples are the Salem initial circuit breaker failure and the Hatch-2 event.

i) In the aviation industry there is a greater degree of trust and cooperation among the parties (FAA, NTSB, airline, manufacturer, etc.) during the investigation of an accident. Investigations are conducted in a less adversarial atmosphere than in the nuclear industry. There are a number of reasons for this. The emotional impact of an aircraft disaster is one. A second reason is the direct and immediate incentive that all parties in an investigation have to determine the cause and prevent recurrence. A third reason is the spirit of camaraderie and the romantic aura that still attaches to the aviation industry and affects those associated with it, especially those who have grown up with it. These factors may operate to a lesser degree in the nuclear industry. A final reason is the absence of a determined opposition which questions the need for air transport, unlike the situation in the nuclear industry.

j) The competitive climate is very different in the two industries. Especially since deregulation, the airlines compete, while the utilities are regulated monopolies and do not compete. An airline which acquires a reputation for a poor safety record may lose business to a competing airline with a good safety record. This provides an additional incentive for maintaining reliable and safe operation by preventing accidents and cooperating wholeheartedly in an accident investigation.

4.3 Degree of Independence Required

The FY 1985 NRC Appropriations Act called upon the NRC to conduct a study on the need for an independent organization to investigate significant safety events. There was no definition of "independent". The term "independent organization" could mean an organization independent of the NRC as the NTSB is of the FAA, as has been suggested by some, or an organization independent only of the regulatory, licensing, and inspection and enforcement responsibilities of the NRC staff.

If the intent is to establish an organization to investigate operational events and also to maintain general oversight over the performance of the NRC, INPO, and utilities on nuclear power plant safety, then clearly an organization totally independent of the NRC is desirable. It should be recognized that the NTSB, although it has been given what may be interpreted as a general oversight role over the FAA, has, in fact, exercised this role with discretion and rather selectively. The necessity for selectivity in this area is dictated by the great difference in the size of the NTSB and FAA.

If the responsibilities of the organization are limited to investigation of events, determination of cause, the development of recommendations, and the conduct of studies, then it should at least be independent of the regulatory, licensing, inspection and enforcement arms of the NRC in order to avoid a potential conflict of interest due to past actions or inactions in these areas. Three alternatives for an independent organization are suggested: 1) an organization independent of the NRC, which will be designated the Nuclear Safety Board (NSB), similar to the NTSB; 2) an organization designated as the Office of Nuclear Safety (ONS) reporting to the NRC Commissioners; and 3) an ONS reporting to the NRC Executive Director for Operations (EDO). These three options differ from each other in the degree of independence from the regulatory, licensing, inspection and enforcement functions of the NRC and from the NRC itself.

Whether the organization should be an NSB, ONS/Commission, or ONS/EDO would depend upon public perception of the objectivity of the organization. Public confidence in the NRC and the nuclear industry may be increased by an investigatory agency which is independent of the events and operations it investigates. However, there is no obvious way to determine by a study such as this whether public confidence in nuclear power regulation would or would not be improved by an independent NSB, although in the aviation ind stry the NTSB, which is independent of the corresponding regulatory agency, the FAA, obviously enjoys public confidence in its objectivity and effectiveness.

4.4 Objective

It is proposed that a statutory independent safety organization (ISO) be established, which would have as its primary objective the promotion of nuclear safety by conducting investigations (fact finding and evaluation) of significant operational safety events at NRC-licensed facilities, to determine cause, and the formulation of safety recommendations to the NRC to prevent the recurrence of such events. The principal objectives would be:

- Objective investigations (fact finding) of significant safety events;
- an analysis and evaluation of the facts leading to the determination of probable cause;
- the development of public recommendations to the NRC to prevent recurrence of such events and enhance safety;
- follow-up to see that recommendations are implemented;
- continuing analysis and evaluation of operational data and licensee event reports to search for accident precursors and patterns and trends;
- conduct of special safety studies and development of recommendations.

4.5 Authority and Responsibility

This organization would have the characteristics, authority and responsibilities outlined below. It would:

a) Be headed or directed by a recognized technically qualified person or persons who have the respect and confidence of the technical community.

b) Determine the facts, conditions, circumstances, and the cause of accidents and significant safety events at NRC-licensed facilities, except, possibly, for those occurring in facilities under the jurisdiction of Agreement States.

c) Have the primary jurisdiction over the investigation of all operational events at NRC-licensed facilities, but have the power to delegate investigation of less significant operational events as it deems fit.

d) Have the responsibility to define a significant safety event for purposes of investigation, the definition to include as a minimum those events which currently fall into the category of Abnormal Occurrences, and events in the alert or higher emergency category. It would also be able to adjust the threshold for investigation up or down, as required.

e) Establish a "Go Team" for investigating significant operational safety events. This team would direct and coordinate all investigations of a specific event. The size of the investigating team would be determined by the ISO and would depend upon the magnitude and degree of complexity of the event.

f) Make public recommendations to the NRC to prevent recurrence of the investigated events, with a public response required of the NRC within a fixed time period, the response to include a schedule for implementation of the accepted recommendations and the reasons for rejecting any recommendations.

g) Systematically compile and analyze operating and LER data.

h) Conduct special studies and investigations pertaining to nuclear safety.

i) Hold hearings, issue subpoenas, administer oaths, preserve evidence, etc. in connection with its investigations of significant operational events.

j) Develop licensee event report requirements.

4.6 Event Investigation

The operational events at NRC-licensed facilities may be divided into four categories:

A. Operational events at nuclear power plants

B. Nuclear safety-related events at fuel cycle facilities

C. Safety-related events involving medical and industrial uses of radioactive sources and source materials

D. Safeguards and security events involving nuclear materials at NRC-licensed facilities.

It is proposed that the investigation of events of Categories A and B be within the primary scope of the ISO. The investigation of events of Category C in Agreement States would be delegated to the responsible authorities in those states (currently there are 27 Agreement States), unless the state authorities requested ISO assistance, or there was reason to believe the state was unable to conduct an adequate investigation, or a broad safety issue was believed to be involved. In non-agreement states the ISO would investigate events in Category C. The investigation of events in Category D would continue as at present with such agencies as the local police and the FBI taking the primary responsibility for criminal investigations, and Nuclear Material Safety and Safeguards (NMSS) investigating possible failures of the safeguards system. The ISO would, therefore, be responsible for the investigation of events in Categories A and B, and for Category C in non-agreement states. The ISO would have the prerogative of delegating the responsibility for the investigation of minor or non-significant events in even these categories to the Regional or I&E offices of the NRC. It is the suggestion of the BNL Task Force that the ISO be devoted primarily to the investigation of significant events at nuclear power plants and, while maintaining oversight, delegate the investigation of events at the non-power reactor NRC-licensed facilities to the appropriate NRC offices such as Regional or I&E. In order to carry out their licensing, regulatory, and inspection and enforcement responsibilities, the relevant NRC offices would also have the authority to participate in the investigation of all events.

The ISO would be notified of events through the 10 CFR 50.72 reporting system and through review of the Daily Reports made by the NRC Regional Offices, which include reports from the Resident Inspectors. ISO field investigators located at the NRC Regional offices, by having access to the 10 CFR 50.72 reports and the Daily Reports, could provide the means for notification to ISO headquarters and the initiation of investigation of significant events. These field investigators could provide the screening of all unusual events. Relatively minor or non-significant events could be investigated for determination of cause by one or two field investigators. Significant events requiring full field investigations would require the resources of ISO headquarters staff.

In conducting investigations of significant operational safety events at NRC-licensed facilities, it is recommended that the ISO use the "party system", as is done by the NTSB. A "Go Team" would be set up and headed by an ISO person and would include other technical staff from ISO. This team would be responsible for responding immediately to a significant event to collect evidence and determine the facts, conditions and circumstances of the event. It would be dispatched to the licensee's site as soon as possible after notification of a significant event, but would not participate in the emergency response. Except for those activities which can be undertaken without interfering with the emergency response, it would begin its investigation as soon as the emergency is over. The NRC would maintain its responsibilities for the emergency response as outlined in NRC Manual Chapter 0502. It is expected that the NRC's Director of Site Operations (DSO) would determine when an investigation of the event could proceed.

The Go Team would be composed of ISO personnel and experienced technical and operational experts from appropriate NRC offices such as the regional offices, Office of Inspection & Enforcement, Office of Nuclear Reactor Regulation (NRR), and organizations such as the Institute of Nuclear Power Operations (INPO), utilities, EPRI-Nuclear Safety Analysis Center (NSAC), and reactor and possibly component manufacturers. It would have primary jurisdiction over the investigation of significant events and direct all phases of the investigation. It would have as its sole mission the accumulation of facts regarding the significant event for the purpose of determining cause, rather than the verification of regulatory compliance. It is recognized that the regional offices and the Office of Inspection & Enforcement would continue to have the responsibility for determining compliance with NRC rules and regulations. The Office of Nuclear Reactor Regulation would maintain its responsibility for licensing and regulating NRC-licensed facilities. Some additional investigation may be required for these purposes but would not be allowed to interfere with the fact-finding investigation. However, as in the case of the NTSB investigations, it is anticipated that the fact-finding investigation would provide most of the factual basis for the determination of compliance. It is also expected that the appropriate NRC offices would maintain their responsibilities for shutdown or startup of the nuclear power plant after a significant event. The responsible NRC official would authorize startup of a plant after a significant event following consultation with the ISO person in charge of the event investigation to ensur~ that the startup would not interfere with the fact finding.

Following completion of the fact finding, which may include hearings to place evidence on the record and to receive the views and recommendations of other parties, the ISO would have the sole responsibility for determining the cause, probable cause or causes of the significant event.

Other organizations such as the NRC (NRR, I&E, Regions), INPO, EPRI-NSAC, or utilities could concurrently evaluate the facts and make a probable cause determination and submit it to the organization. This organization, before it issued its final report, would be obligated to consider the submitted analyses. On the basis of its findings it would formulate recommendations which would be placed in the public record and submitted to the NRC for its consideration. The NRC would be required to respond publicly to those recommendations within some stipulated time, such as 90 days, accepting or rejecting the recommendations in full or in part, providing a schedule for the implementation of those recommendations it accepted and explaining the reasons for any rejections. The NRC would also be required to review the recommendations of such parties as INPO, utilities and manufacturers in its consideration of the ISO recommendations.

In addition, in order to assure the identification of all significant operational safety events, it is recommended that the organization develop a designated-representative (DR) system to monitor all events occurring at the nuclear power plants for a given utility. As a consequence of the TMI-2 accident, every utility having nuclear power stations must have a safety board with oversight responsibilities over operational events which reports to high-level corporate management. The utility safety board generally has the responsibility for reviewing and recommending corrective action. One member of this board could be a designated representative for the ISO. As a member of the utility safety board he would participate in the review of all operational events occurring at the nuclear plants of that utility and, thus, he should be intimately knowledgeable about all such events. The DR would thus be aware of all safety matters regarding the utility's nuclear plants. The DR's responsibility would be to ensure accurate reporting and appropriate identification of events to the NRC and ISO if required. This should help alleviate the problem of identification of significant events. The DR would provide a direct contact between the utility and the ISO. The designated representative system should not be confused with the party system discussed previously for the conduct of investigations. However, there is no reason the DR could not serve as a party in an investigation.

4.7 Size of Organization

The size of an ISO should be determined by such factors as: the scope of responsibilities, the total number of events per year, the number of significant events per year requiring full field in-depth investigation, and the number of case studies and patterns and trend analyses per year that are conducted. It is proposed that the ISO have the responsibility for conducting investigation of and determining the cause of significant events at NRC-licensed facilities and also assume the responsibilities of the AEOD as outlined in Section 2.1.1. The size of the ISO could be approximately determined by taking the size of AEOD and adding to it the number of technical staff required for the investigation and determination of cause of significant events.

The numbers of unusual events and alerts reported under 10 CFR 50.72 in 1983 and 1984 are listed below:

Type	1983	1984
Unusual Event	205	224
Alert	7	8

The number of Licensee Event Reports (LERs) reported in 1983 and 1984 was about 4800 and 2200, respectively. The significant decrease in 1984 was due to a revision of the criteria for filing an LER in 10 CFR 50.73. In each of years 1983 and 1984 8 events were classified as abnormal occurrences in the approximately 80 reactors with operating licenses. If these are considered significant events for investigation purposes, one could expect at least 8-12 significant events per year at nuclear plants requiring full field investigations for the 85 plants (as of December 1984) now having operating licenses. It is difficult to predict the number of significant events which might occur per year and which would require full field investigations when the total number of operating nuclear power reactors increases to the currently projected 129. It is assumed that the number of significant events per NPP per year would decrease with improved maintenance and additional experience. It is estimated, therefore, that the number of significant events requiring full field investigation in the future, when all 129 plants become operational, would not exceed about 20-25 per year. The size of the ISO will thus be estimated on the assumption it would conduct about 20 full field investigations per year.

The BNL Task Force was unable to obtain detailed statistics on the amount of effort required to investigate past events such as those at Salem-1 or Hatch-2. On the basis of a rough estimate of between 12-16 man-months of NRC staff resources required for the investigation of the Salem-1 event, it is possible to make approximate estimates of the resources required for the investigation of significant events at nuclear power plants. For 20 significant events per year requiring full field investigation, the effort is estimated as about 20-26 man-years. Use of the NTSB-type party system would provide additional resources from INPO, NSAC, utilities, and vendors when necessary. In addition, of course, personnel from NRR, I&E, and the Regions would participate in all investigations.

Since it will be some time before all 129 reactors are in commercial operation, it is suggested that an ISO having the resources to conduct about 12 full field investigations per year at nuclear power plants, requiring about 15 man-years of effort, be established initially, for the first 3-4 years.

ISO staff representatives would also be required at the five regional offices to aid in the screening of telephone reports of events reported under 10 CFR 50.72 for significance, conducting individual field investigations of minor or non-significant events at all NRC-licensed facilities, and participating in the full field investigations of significant events. It is estimated that the screening for significance of 200-300 unusual events per year and conducting individual investigations would require an additional two to three technical ISO representatives at each of the five regional offices. This would add 10-15 additional staff to the 15 required for full field investigation, for a total of 25-30 ISO staff devoted to the screening and investigation of about 12 significant events per year. Since the screening of unusual events is currently being carried out by the staff in the Regional, I&E and NRR offices, perhaps a fraction of the staff required for screening of events for the ISO could be reassigned from existing offices. As additional nuclear power plants become fully operational and experience is gained in the investigation of operational events with emphasis on determination of cause, the resources allocated to the ISO for this objective could be modified.

Assuming that the ISO took over the activities of the AEOD as discussed in Section 2.1.1 for such areas as case studies, pattern and trends analysis, collection of operational data, LER coordination, etc., the staff size required for these activities would be similar to that of AEOD, i.e., about 40 members possibly increasing to about 50 as currently desired by AEOD. This staff would be divided into about 42 technical professionals and 8 support staff.

The total number of technical professionals required for the proposed ISO would thus be about 67-72, broken down as follows:

> 10-15 at Regional Offices (2-3 per office)
>
> 15 at Headquarters for investigations and determination of cause of significant events
>
> 42 for current AEOD activities

This does not include administrative or support personnel such as secretaries, computer programmers, clerks, data handling assistants, etc.

The pros and cons of the three suggested alternative forms of the proposed new investigative office will now be discussed.

4.8 Office of Nuclear Safety - EDO

One organizational alternative would be to establish an Office of Nuclear Safety (ONS) as a statutory office at the same level as the Offices of Nuclear Reactor Regulation (NRR), Nuclear Regulatory Research (RES), and Inspection and Enforcement (E&I). The ONS would be headed by a director reporting to the EDO, appointed by the NRC Chairman and serving at the pleasure of a majority of the Commission. Since it would be a statutory office, the director could report directly to the Commission if he wished, as can the directors of NRR, NMSS and RES today. ONS would absorb the existing Office for the Analysis and Evaluation of Operational Data (AEOD) and its functions, which include: 1) establishing reporting requirements for licensee event reports (LERs); 2) compilation and analysis of LERs; 3) case and trend and pattern analysis; 4) special studies; 5) publication of periodic reports such as the Power Reactor Event Reports, etc. The pros and cons of this arrangement are discussed below.

4.8.1 Advantages of ONS Reporting to EDO

a) It would provide the closest possible communication and integration with the knowledgeable NRR, I&E, and RES staff.

b) It is estimated that in addition to the projected AEOD technical staff of about 42, an additional 25-30 engineers (10-15 being stationed at the Regional Offices) would be required to carry out the added responsibilities. This approach would probably cost less to the government than a completely independent agency.

c) If there are few significant events, the ONS staff could be utilized as supporting staff to the EDO, thereby efficiently utilizing scarce experienced technical staff.

d) Being a part of the NRC would provide career opportunities which would make positions in ONS more attractive to qualified technical personnel.

e) Being a part of a larger organization in times of budget constraints would provide greater job security and therefore be more attractive to personnel.

f) A statutory ONS would have greater visibility, permanence and prestige, and have the stature to ensure that its recommendations were seriously considered in a timely manner.

4.8.2 Disadvantages of ONS Reporting to EDO

a) It would not be organizationally independent of the regulatory staff. Therefore, it would be vulnerable to charges of a lack of objectivity and a potential conflict of interest.

b) It would not be in a position to ensure prompt consideration of its recommendations by the NRC regulatory and I&E staff.

c) The availability to the EDO for the performance of staff functions could dilute the investigative effort and compromise the organization's objectivity and independence.

d) Subordination to the EDO would lessen the public visibility of the organization relative to the other alternatives.

4.9 Office of Nuclear Safety - Commission

The second alternative is a statutory Office of Nuclear Safety headed by a director reporting directly to the NRC Commission. The director would be appointed by the NRC Chairman and would serve at the pleasure of a majority of the Commission. The ONS-C would absorb the present Office for Analysis and Evaluation of Operational Data (AEOD) and its functions. The advantages and disadvantages of the ONS-C are now considered.

4.9.1 Advantages of ONS Reporting to the Commission

An ONS reporting to the Commission would have much the same advantages in the area of investigations as outlined for ONS-EDO, and would have the following additional advantages:

a) Greater public visibility.

b) Complete independence from the regulatory, licensing, and inspection and enforcement staff.

c) Better mechanism for constructive criticism of NRC rules, regulations, procedures and actions by routinely having direct access to the Commission.

d) Greater incentive for the resolution of technical issues in a more timely manner by the Commission through the use of public recommendations to which public response by the regulatory staff would be required within a fixed time.

e) Lower costs than an independent safety organization, but possibly about the same as an ONS reporting to the EDO.

f) Possible utilization as supporting technical staff to the Commission, if work load permits, thereby using scarce experienced technical staff more efficiently.

g) Better communication with the staff on a less formal basis than for a totally independent agency.

4.9.2 Disadvantages of ONS-C

The disadvantages of tne ONS reporting to the Commission are discussed below.

a) Lack of independence from the Commission; therefore possible vulnerability to charges of lack of objectivity arising from approval by Commission of prior NRC licensing, regulatory, and inspection and enforcement actions.

b) Possibly greater inhibition against criticizing previous Commission actions than an NSB.

c) Owing to its subordinate status, possibly less influence with the Commission than a totally independent agency.

d) Less public visibility than an organization independent of the NRC.

e) Somewhat poorer, more formal communication with the NRC staff than for an ONS reporting to the EDO.

4.10 Nuclear Safety Board (NSB)

The third alternative, a Nuclear Safety Board (NSB), an agency independent of the NRC and similar in structure to the NTSB, would have responsibilities similar to those described for the ONS. It is proposed that the functions of the NRC's Office for Analysis and Evaluation of Operational Data (AEOD) would be taken over by the NSB, as with the previous two options.

The main advantage of such an organization would be its total independence from the NRC or any other executive office or agency (as with the NTSB, its budget would be submitted simultaneously to the Office of Management and Budget and to Congress). Of the three choices it would therefore be the most objective and the least inhibited in criticizing NRC when the circumstances warranted it. If extensive institutional oversight of the NRC were to be judged desirable by Congress, an independent NSB could best provide the investigatory and oversight functions. It would also be in the best position to foster a non-adversarial, cooperative spirit during investigations, since it would not be associated organizationally with the regulatory agency. It would be free to devise its own rules and procedures for conducting investigations and hearings, subject, of course, to the powers granted it and the limitations imposed on it by the enabling legislation. It would also be free to apportion its resources as it saw fit to best accomplish its purposes, and would have the most complete control over the hiring and firing of its staff.

4.10.1 Arguments for a Nuclear Safety Board

The principal arguments in favor of the establishment of a totally independent organization are as follows:

a) It would have the same advantages as an ONS in the conduct of the investigations, assuming that it made the same use of the party system and designated representatives.

b) It could more objectively investigate operational events whose cause may have been related to past NRC inspection and enforcement, licensing, or other regulatory actions.

c) Its greater visibility would provide better assurance that its recommendations made publicly and requiring a public response by the NRC within a fixed period of time would be objectively considered.

d) Its oversight over safety recommendations and implementation would encourage NRC to resolve generic technical safety issues in a more timely manner.

e) A totally independent investigative agency with some watchdog powers may increase public confidence in the safety of nuclear power plants.

f) It would:

- provide a mechanism for constructive and objective criticism of NRC rules, regulations, procedures, and actions;
- allow NRC to concentrate on licensing and enforcement actions.

4.10.2 Arguments Against a Nuclear Safety Board

The arguments against the establishment of an organization independent of the NRC are as follows:

a) Unlike the FAA which controls the use of air space through its Air Traffic Control System, operation of navigational aids and dissemination of weather information, and which therefore may be directly implicated in an accident, the NRC has no direct operational role in the activities it regulates. There is, therefore, less need for a totally independent organization to investigate operational events.

b) Since significant events requiring detailed investigations may amount to only 8-12/year and at most an estimated 20-25/year when all reactors under construction are operational, and events involving considerable damage have been very rare (one accident [TMI-2] in over 20 years of commercial nuclear power plant operation), and those involving fatalities or injury to the general public have been non-existent, the additional operating costs and regulatory burden of such an agency may not be justified.

c) An NSB would place greater demand upon the relatively small pool of available highly competent experienced technical and operating personnel in the nuclear power field. A small separate governmental agency at relatively limited salary ranges and opportunities for career advancement and greater vulnerability to budget fluctuations would have difficulty in attracting and retaining qualified experienced personnel.

d) Since NRC already is headed by a 5-person politically appointed Commission, which provides for a diversity of views on policy and its implementation, the need for yet another agency with a similarly constituted directorship to oversee NRC's operations is not apparent. There is also a danger that a dual arrangement of this sort could immobilize the regulatory process.

e) Open differences of opinion, especially on highly complex or technical issues, between the NRC and an NSB, could result in public controversy and decreased public confidence in the regulation of nuclear power.

f) If the establishment of an NSB only increased the number of investigations after a significant safety event rather than eliminating overlap, an additional burden could be placed upon the nuclear power industry without increasing safety.

g) A separate agency would probably result in a more formal and therefore possibly less effective communication and interaction with the NRC staff, to the detriment of its performance.

h) The small staff would feel a greater sense of professional isolation and lack of technical cross-fertilization than if the agency were organizationally a part of NRC.

5. NUCLEAR SAFETY BOARD ORGANIZATION AND COSTS

Congress requested the NRC to include in the study a discussion of organizational options and costs for the establishment of an independent safety organization. On the basis of the required functions and capabilities of an independent safety organization discussed in the previous chapter, organizational options for a Nuclear Safety Board are developed. Three general functions must be carried out by any organization: executive, administrative, and operational. Each of these elements will be examined as modules and sub-modules that can be retained or discarded as the concept of an independent nuclear safety organization is further developed. For example, if the long-range trend analysis and evaluation function were to remain within the NRC, that module would be discarded from the safety organization.

5.1 Executive Function

As discussed earlier in this report, the National Transportation Safety Board (NTSB) is run by a five-member board, with a "strong" Chairman as chief executive and with a Managing Director to handle day-to-day operations. The NTSB's regulatory counterpart, the Department of Transportation (DOT), is headed by a Cabinet member, and the various Administrations within DOT, such as the FAA for aviation, that interface with NTSB on actual accident investigations, regulatory issues, etc., are headed by single administrators.

The options for the Nuclear Safety Board executive function are 1) a multi-member board, or 2) a single administrator. The board arrangement appears to be working well at the NTSB. However, one may question the desirability of creating a board-type executive for a Nuclear Safety Board that would interface with the present five-member NRC.[1] This would mean that the two key nuclear safety organizations in the U.S. would be headed by multi-member groups of political appointees.

Nevertheless, the structure of NRC aside, an independent nuclear safety organization could be headed by a three- to five-member board patterned after the current NTSB board with the following characteristics:

- Board members would be appointed by the President with the advice and consent of the Senate;
- board members would serve staggered, multi-year terms;
- make-up of the board would have political party restrictions;
- the majority of the board members would be required to be technically qualified in the nuclear power or related fields; and
- the Chairman would be delegated strong executive powers.

A possible option for the Nuclear Safety Board executive function, even if NRC retains its present five-member board, would be the establishment of a three-member board with a strong Chairman as chief executive. This approach was adopted in Rep. Udall's legislative proposal in H.R. 6390, introduced in 1980. Should this option be selected, the five characteristics listed above would still apply.

If the organization were to be headed by a single administrator, that person would be appointed by the President with the advice and consent of the Senate.

---

[1]Recommendations have been advanced from time to time to change the current NRC to provide for a stronger chief executive or a single administrator.

Within the executive function, whether it be a board or single administrator, would be the necessary legal support, both reporting directly to the chief executive and/or the board through a General Counsel as well as carrying out any administrative law functions that would be part of the Nuclear Safety Board's responsibility.[2] This function is particularly critical immediately following accidents or significant safety events and during follow-up of board recommendations. Should a board form of executive be established, the board, at its discretion, might establish a position of Managing Director to handle routine, day-to-day operations. This decision may be left to the board, since a strong Chairman could also carry out this function.

Finally, but not least important, there should be a group within the executive function responsible for liaison with Congress, various federal agencies including NRC, state governments, the press, and the public.

In considering the board vs. single administrator question, it should be noted that the NTSB board does decide, as a group, what the probable cause of an accident was and what recommendations should be made to the Department of Transportation or to the FAA for aviation accidents to prevent future accidents or to address other topics identified during the course of NTSB's general studies and assessments. Thus, a board structure provides a measure of checks and balances. Consequently, it would seem to make more sense to have the NRC headed by a single administrator and the Nuclear Safety Board headed by a board if statutory NRC oversight responsibilities are required by Congress.

---

[2]It is envisioned that a Nuclear Safety Board would have powers similar to those of the NTSB to hold hearings, issue subpoenas, etc. Therefore, it would need an Administrative Law function.

5.2 Administrative Function

Clearly, any organization needs administrative support, and where that function is placed in an organization is not critically important; nor is it dependent on the type of executive function selected. For example, in the NTSB, the Bureau of Administration is one of the "line" organizations, while at NRC, the administrative functions are largely grouped under the Executive Director for Operations (EDO), although each NRC office, including the Regional Offices, has some administrative resources within it. Probably the best solution is to let the NSB deal with this question as it sees fit. If it is desirable to minimize costs, an option would be to have the NRC administrative division handle the NSB administrative functions.

5.3 Operational Function

The Nuclear Safety Board would assume the functions and responsibilities of the current NRC's Office of Analysis and Evaluation of Operational Data (AEOD) and have as its two primary missions: 1) accident and event investigation, and 2) evaluation and analysis. The basic organizational structure that would accommodate the executive, operational and administrative functions is that shown in Figure 5.1.

Two other groups should be considered for the Nuclear Safety Board -- a technology group and a field operations group (see Figure 5.2). The need for a technology group would depend largely on the degree of technical independence from NRC that is desired for the organization. In addition, a technology group separate from the investigations group and the evaluation and analysis group would be less likely to become captive to investigations at the expense of evaluation and vice versa.

BASIC ORGANIZATIONAL STRUCTURE OF AN
INDEPENDENT NUCLEAR SAFETY ORGANIZATION

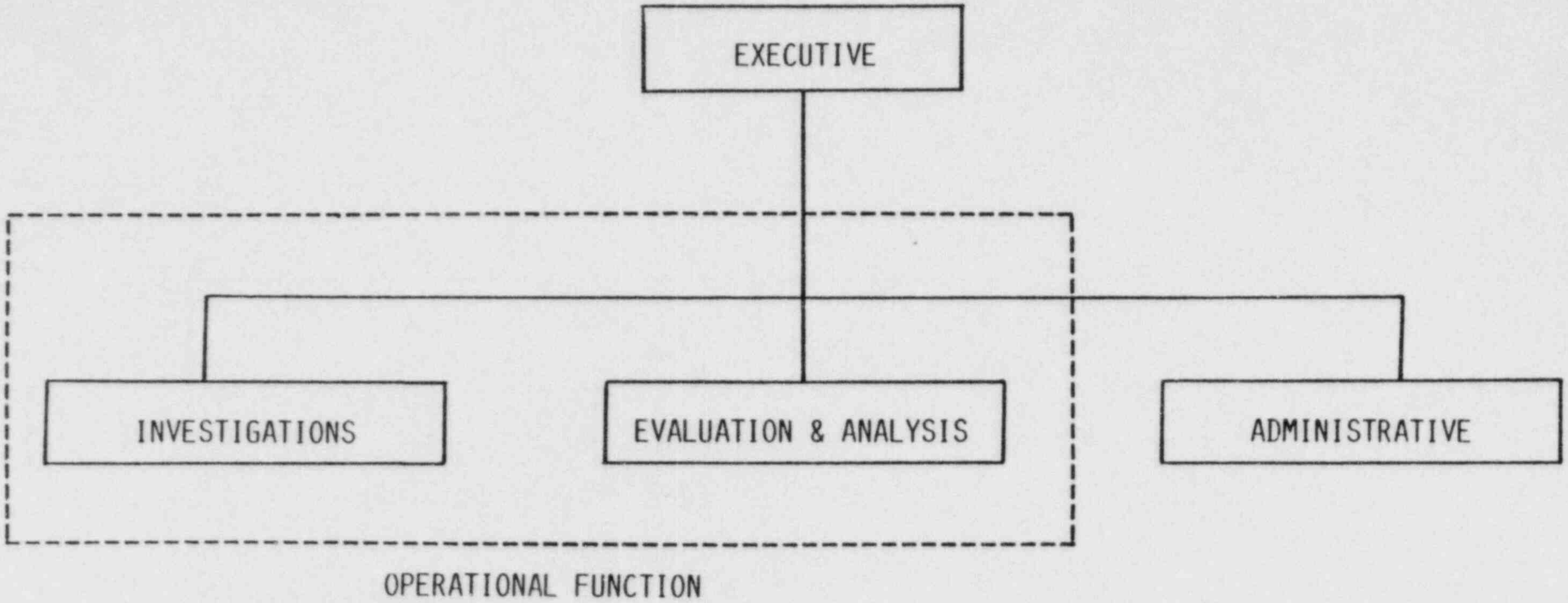


FIGURE 5.1

ORGANIZATIONAL STRUCTURE OF AN
INDEPENDENT NUCLEAR SAFETY BOARD
PATTERNED AFTER THE NTSB

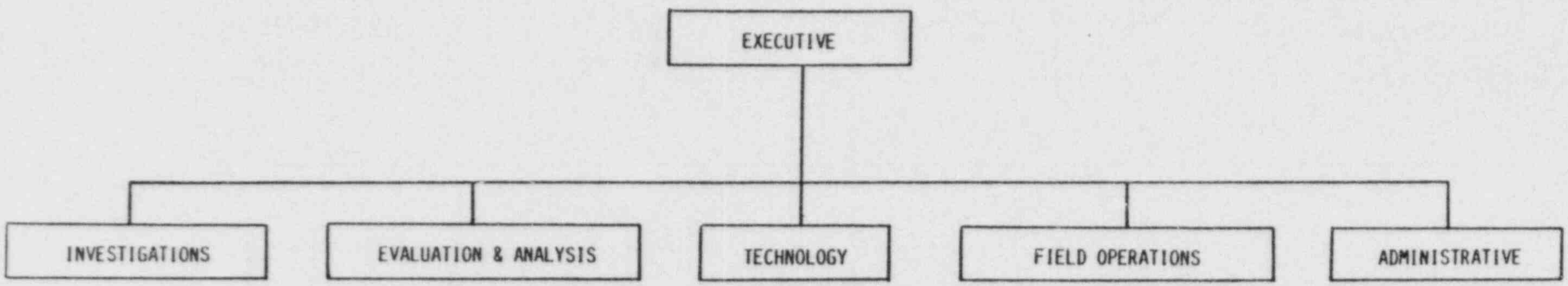


FIGURE 5.2

Field operations could 1) put investigators closer to NRC licensees, and 2) put investigators closer to the NRC field operations and onsite inspectors who are most familar with licensee operations.

The subordinate organizational groups are then largely driven by 1) the types of facilities that NRC licenses and at which accidents or operational events may occur, 2) the spectrum of technical disciplines that are required to understand accident initiators, sequences, consequences, preventive measures, etc., as well as the regulatory process and the requirements of that process, and 3) the geographical coverage of the organization.

5.4 Organization Structures

An expansion of Figure 5.2 into a more detailed organization that is patterned after the NTSB results in an organization shown in Figure 5.3. The Investigations Group, which would have responsibility for investigating events, incidents and accidents, would consist of three branches: a Power Reactor Branch, a Transportation and Waste Management Branch, and a Fuel Fabrication, Research and Test Reactors, and Materials Branch. This approach separates accident and event investigation responsibilities by type of facility involved, grouping certain facilities for efficiency.

The Nuclear Safety Technology Group would be divided into at least six branches (and there could be several more) that correspond to the technical disciplines that are needed to investigate accidents as well as conduct broader studies and analyses. This Group would support the Investigations Group during accident investigations, as needed, and at all other times would support the Safety Assessment Group in ongoing studies, assessments, etc. The inclusion of the Nuclear Safety Technology Group is somewhat

DETAILED ORGANIZATIONAL STRUCTURE
OF AN INDEPENDENT NUCLEAR SAFETY BOARD

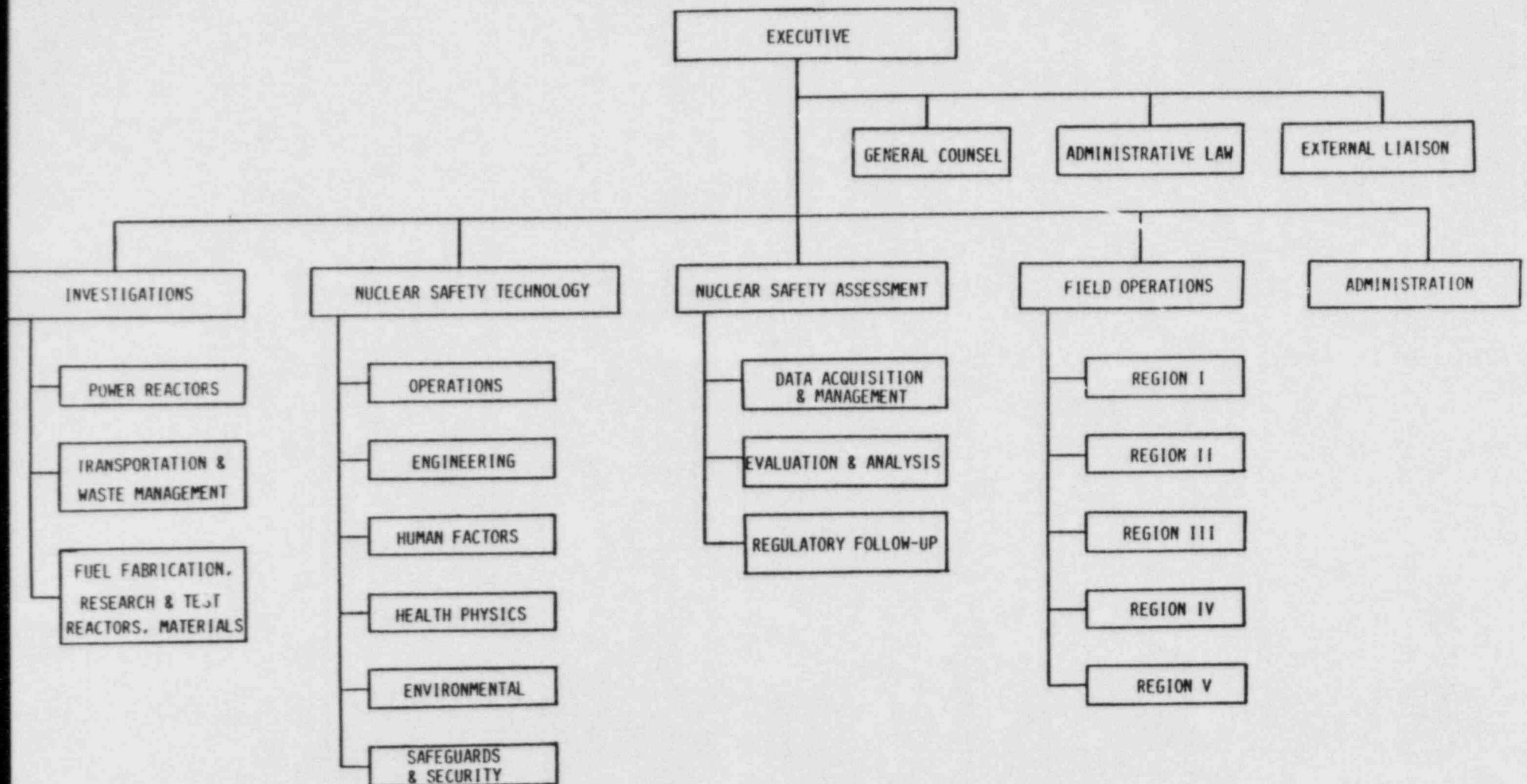


FIGURE 5.3

optional, since, during investigations, the accident investigators could rely on outside technical assistance from NRC, the industry, or hired consultants and contractors. However, without this capability, the independence of the organization could be questioned.

The Nuclear Safety Assessment Group would have responsibility for conducting general safety studies and analyses, trend analyses, and follow-up of NRC and industry actions in response to the organization's recommendations. This group would be subdivided into the Data Acquisition and Management Branch, the Evaluation and Analysis Branch, and the Regulatory Follow-up Branch.

The Field Operations Group in the NSB would be subdivided according to the current NRC regional office structure. The purpose of the Field Operations Group would be to 1) support the Investigations Group by conducting short investigations of minor events and to prepare a report, and 2) support the Safety Assessment Group by gathering data from NRC licensees, during the course of the routine investigations, that might not be available through the normal licensee-NRC or licensee-nuclear safety organization channels.

The Administration Group could be organized a number of ways at the direction of a board or chief executive.

An obvious modification to the organization shown in Figure 5.3 would be to delete the Nuclear Safety Technology Group and either 1) put those capabilities in either the Investigations Group or the Safety Assessment Group or both, or 2) rely on external technical support. As discussed previously, option (1) could make it more difficult for technical skills to be made available across the organization and, thus, lead to duplication of skills. Option (2), on the other hand, could impair the independence of the organization by forcing it either to rely solely on the NRC or the industry for technical support or to contract for consulting services as needed.

Another modification that could be considered would be to delete the Field Operations Group. However, there would still need to be frequent contact between the nuclear safety organization, NRC licensees, and the NRC regional inspection functions so that even if the Field Operations Group were deleted as one of the main groups, the function would have to be retained under the Investigations Group.

Including Field Operations within the Investigations Group would not diminish the capabilities of the organization, but would provide for some streamlining. Therefore, a good reference organization, for discussions of staffing requirements and costs of establishing a Nuclear Safety Board is shown in Figure 5.4.

5.5 Operating Costs

The annual operating costs for a Nuclear Safety Board will consist of:

- Personnel compensation
- Personnel fringe benefits
- Travel
- Office space, utilities, communications
- Miscellaneous expenses including funds for consultants, technical assistance, and reimbursables to the NRC and its national laboratory consultants.

Personnel compensation and fringe benefits are obviously directly proportional to the number of staff members in the organization. An examination of the budgets for the NTSB for fiscal years (FYs) 1983, 1984, and 1985 shows that the expenses other than personnel compensation are fairly constant fractions of the total personnel compensation.

One-time start-up costs will be examined separately from the annual operating costs, although it is not envisioned that there will be any significant start-up costs. Such costs could be large only if the organization were to include laboratory equipment, large computing facilities or some other large items. Laboratory and computing facilities would be available from existing Department of Energy national laboratories or university research laboratories.

5.5.1 Staffing Requirements

Figure 5.4 will be used as the reference case for estimating the number of personnel required to staff an independent nuclear safety organization. However, the estimates that follow are not based on an in-depth analysis but, instead, are based on 1) the total number of operational events as evidenced by the licensee event reports to be screened (estimated to be currently about 2200/year for the 85 plants with operating licenses and about 3300/year for 129 plants); 2) the number of events which require full field investigations (approximately 8-12/year for the first 3 to 4 years); and 3) the number and type of facilities that NRC regulates and are thus possible locations for incidents that would need investigating.

The estimates that follow are thought to be minimum staffing requirements (i.e., the minimum number of personnel needed to carry out the functions described in Figure 5.4).

OPTIONAL ORGANIZATIONAL STRUCTURE
OF AN INDEPENDENT NUCLEAR SAFETY BOARD

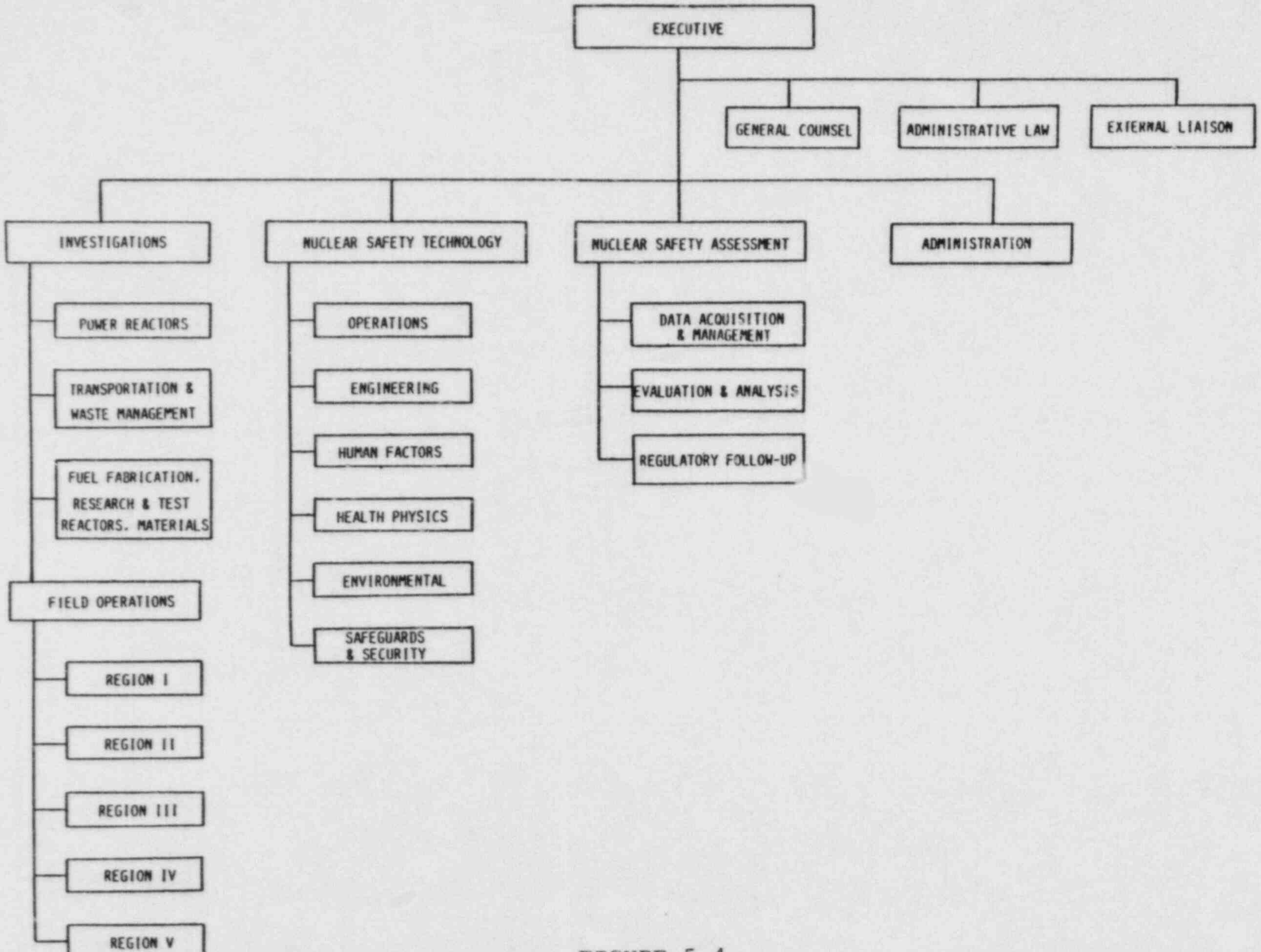


FIGURE 5.4

5.5.2 Executive Group

Two different types of executive functions were considered in Section 5.1; the single administrator and the board. Staffing for a single administrator executive would be as follows:

Administrator	1	(1) [3]
Deputy Administrator	1	(1)
Technical/Legal Staff	2	(1)
TOTAL	4	(3)

Should a five-member board be chosen as the executive function, staffing requirements would increase as follows:

Board Members	5	(5)	
Staff Support to Board Members	6	(2)	[1 staff for each member; 2 for the Chair[illegible]n]
Executive Director	1	(1)	
TOTAL	12	(8)	

There are three executive staff support organizations identified in Figure 5.4, and these would be staffed as follows:

General Counsel	2	(1)
Administrative Law	2	(1)
External Liaison	2	(1)
TOTAL	6	(3)

The Administrative Law function would obviously depend on the number of hearings that the organization would handle in a year. As with the rest of the staffing estimates, this estimate is believed to be the minimum required. Nonetheless, these

---

[3] Numbers in parentheses indicate support staff requirements.

estimates show that the executive function could have as many as twenty-nine (29) full-time staff or as few as sixteen (16), depending on which form is established (i.e., board or single administrator).

5.5.3 Investigations Group

The Investigations Group would have primary responsibility for conducting investigations of the approximately 8-12 significant incidents that occur each year which require full field investigations. A suggested staffing plan for the Investigations Group would be:

Director	1	(1)
Power Reactors Branch	11	(2)
Transportation, Waste Mgt., Fuel Fabrication, Research & Test Reactors and Materials Branch	3	(1)
Field Operations Branch	15	(1)
TOTAL	30	(5)

The individuals within the Investigations Group should be able to participate in investigations associated with any NRC-licensed facilities in addition to the facilities associated with their particular branch. Each of the 15 staff members assigned to NRC's regional offices (2-3 staff per office) will have to handle screening of the 200-300 unusual events per year and investigations in the full range of facilities in his region. The provision for 15 individuals at headquarters dedicated to investigating the 8-12 or so significant incidents per year at NRC-licensed facilities seems reasonable given that they can call on other individuals within the organization as well as NRC, the industry, and consultants.

5.5.4 Nuclear Safety Assessment and Technology Groups

For the purposes of this discussion, the two groups for assessment and technology have been combined because these areas are similar to those currently within the responsibility of AEOD. It currently screens about 2200 LERs per year and conducts case studies and trends and pattern analysis and other activities, as described in Section 2.1.1, with a staff of about 40 including support personnel. AEOD anticipates increasing this staff to about 50 to carry out its current responsibilities; thus a staff of 45 technical and 5 support personnel appears to be a reasonable estimate for the combined assessment and technology groups.

5.5.5 Administration Group

As indicated earlier, the exact form and structure of this group could and should be left to the first administrator or board to deal with. However, for purposes of this analysis, the total number of personnel in the Administration Group is estimated to be about 10% of the total number of personnel in the entire organization.

5.5.6 Staffing Summary

Combining the estimates above, the total number of full-time personnel necessary to staff a Nuclear Safety Board is as follows:

	Single Administrator		Board	
Executive	10	(6)	18	(11)
Investigations	30	(5)	30	(5)
Assessment & Technology	45	(5)	45	(5)
Administration[4]	9	(2)	9	(2)
TOTAL	94	(18)	102	(23)

As can be readily determined, a Nuclear Safety Board headed by a single administrator would require an estimated 112 people, whereas an organization headed by a board would require 125.

For comparison, the National Transportation Safety Board (NTSB) has a full-time staff of about 340 people, who issue about 40 major accident investigation reports per year, but who also issue about 3,500 reports (field investigation reports) on less serious accidents, many of which, however, involve fatalities (e.g., in 1983 there were 583 fatal accidents which resulted in 1049 fatalities in the general aviation category). It should be emphasized that many of the less-than-major accidents in the aviation industry involve fatalities and would be considered very serious by nuclear standards. The NTSB would, therefore, be expected to be considerably larger than the NSB. It seems prudent to establish a Nuclear Safety Board with a minimum of staff, allowing it to expand if warranted by its workload.

---

[4] No reduction is made in the Administration Group when considering the single administrator.

5.6 Personnel Costs

Personnel compensation can be estimated by identifying the average annual salary of the organization's employees and multiplying by the total number of full-time employees. The average annual salary for employees of NRC in FY 1985 is $42,300, and the average grade is GS-11.9. For comparison, the same data for NTSB is $39,390 and GS-11.85. For the single administrator and board member positions, the Executive Service (ES) salary of $67,000 per year is assumed. Using these figures, the total personnel compensation costs for the organization can be estimated:

	Single Administrator	Board
Executive Positions	$ 67,000	$ 335,000
Staff	4,695,000	5,076,000
TOTALS	$ 4,762,000	$5,411,000

In addition to these direct personnel compensation costs, employee fringe benefits for the NTSB in FYs 1983, 1984, and 1985 averaged 10% of the total employee compensation costs. Using this percentage, total personnel costs become:

	Single Administrator	Board
Personnel Compensation	$ 4,762,000	$5,411,000
Personnel Fringe Benefits	476,000	541,000
TOTALS	$ 5,238,000	$5,952,000

5.7 Other Costs

Additional costs associated with an independent nuclear safety organization would include:

- Travel
- Office space, utilities, communications, etc.
- Miscellaneous, including NRC reimbursables, consulting fees, technical assistance, etc.
- One-time start-up costs

These additional costs (except the one-time costs) are estimated to be proportional to similar costs incurred by NTSB (i.e., they will be the same fraction of the personnel compensation costs as in the NTSB budget). These fractions, expressed as a percentage of the personnel compensation costs (excluding fringe benefits) are:

Travel	10%
Office space, etc.	16%
Miscellaneous	20%

The one-time start-up costs are estimated to be $500,000 to cover the costs of purchasing computers or other equipment.

5.8 Budget Summary

Using the personnel costs estimated and the fractions assumed, a summary budget for the organization is as follows:

	Single Administrator	Board
Personnel Costs	$ 5,238,000	$5,952,000
Travel	476,000	541,000
Office space, etc.	762,000	866,000
Miscellaneous	952,000	1,082,000
TOTAL ANNUAL BUDGET	$ 7,428,000	$8,441,000
Start-up Costs	$ 500,000	$ 500,000
TOTAL	$ 7,928,000	$8,941,000

Comparing the staff and budget estimates of a nuclear safety board with the NTSB, we find:

	Safety Board	NTSB
Total Annual Budget	$7.43-8.44 million	$20.8 million
Personnel	112-125	343

These figures must be considered rough first approximations of personnel requirements as well as budget estimates. In particular, the multipliers used to estimate non-personnel-related expenses are a very crude approach to estimating these costs, which account for about 30% of the total budget.

6. LEGISLATIVE REQUIREMENTS

Studies of the additional legislative authority and possible changes in the NRC legislative authority required for the establishment of a Nuclear Safety Board independent of the NRC, as well as for the establishment of a statutory Office of Nuclear Safety within the Commission, were conducted by M. A. Rowden and S. E. Fowler of the legal firm of Fried, Frank, Harris, Shriver & Kampelman of Washington, D. C. These studies are included in their entirety as Appendices A and B of this report..

The analysis of the required additional legislative authority was based upon a review of Title IV of H.R. 6390 introduced by Rep. M. K. Udall in January 1980, which was a comprehensive package of amendments to the Atomic Energy Act of 1954, and studies of the acts establishing the NTSB and NRC. The legislation needed to establish a Nuclear Safety Board is provided in Appendix A.

It should be noted that this BNL study of the need for an independent safety organization has not included the question of the need for an oversight body to review the performance of the NRC or for a monitoring station for nuclear power plant operational data, both of which are discussed in H.R. 6390. These questions were regarded as outside of the scope of the present study.

A study of the legislative authority needed to establish an Office of Nuclear Safety within the Commission is contained in Appendix B. A study of the act establishing the NRC indicates that the NRC has sufficient authority to establish an Office of Nuclear Safety within the Commission. A statutory ONS reporting to the Commissioners, as described in Section 4.9, would obviously require changes in the NRC Organization Act.

7. DISCUSSION AND RECOMMENDATIONS

7.1 Review of Findings

A BNL Task Force has studied the need for and feasibility of establishing an independent organization to investigate significant safety events at NRC-licensed facilities. The study has reviewed the present approach to the investigation of operational events at nuclear power plants by the NRC and INPO. For comparison and possible application to the nuclear industry, it has also reviewed the organization and procedures for accident investigations in the aviation industry by the FAA and NTSB. It also has addressed the need for, feasibility of establishing, possible institutional forms, and legislative requirements for an independent organization as an alternative to the present system for investigating nuclear incidents.

The study of the current practices for the investigation of operational events by NRC and INPO to determine cause found them to have generally been conducted in a proficient and technically competent manner, with some exceptions. The BNL Task Force reviews and interviews have suggested that some improvements are needed in this area. These include:

a) A more structured and coordinated approach to the investigation of significant events to minimize the number of overlapping investigations ard to focus more strongly on fact finding and determination of cause as the primary goal.

b) Procedures to "freeze" plant conditions and personnel as soon as possible after a significant event to preserve the evidence for fact finding.

c) Separation of fact finding from determination of regulatory compliance to minimize the adversarial relationship between NRC and utility personnel and to minimize a potential conflict of interest on the part of the NRC staff due to its prior licensing, regulatory, or enforcement actions or omissions.

d) Greater operating experience and training in conducting investigations on the part of investigators.

e) More accurate and timely identification of significant events.

f) Improved feedback in a more timely manner of the results of the investigations, including determination of cause, to the utilities and the public, and more timely consideration of the recommendations.

Although many of the improvements identified as needed by this study could be implemented by the present organization, it is felt that they could be more easily brought about by a new organization divorced entirely from the regulatory and compliance arms of the NRC and focused on fact-finding and determination of cause of significant events. The greater independence should inspire greater public confidence in the investigative process and the increased stature and enhanced visibility of the organization and its procedures would help to ensure more timely consideration and implementation of its recommendations.

Three alternative independent forms of the proposed new organization were considered and compared, namely, an Office of Nuclear Safety reporting to the Executive Director for Operations within the NRC; an Office of Nuclear Safety reporting directly to the Commissioners; and a Nuclear Safety Board independent of the NRC. The three would differ primarily with respect to the degree of independence they would have. Some degree of independence is required in order to avoid a potential conflict of interest of the NRC staff when investigating a significant operational event which may have been caused in part by a previous licensing, regulatory, or enforcement action or inaction.

7.2 Recommendation

As a result of its study, the Task Force recommends the adoption of an investigatory system patterned after that of the NTSB. That model is attractive because it has worked well in circumstances similar to those currently prevailing in the nuclear industry and appears to enjoy a high degree of public confidence. Of the three alternative options considered, the Task Force recommends the establishment of a quasi-independent, statutory Office of Nuclear Safety (ONS) headed by a director reporting to the Commissioners and having the primary responsibility for the conduct of investigations of significant events at NRC-licensed facilities to establish "the facts, conditions and circumstances" of the events, to determine the cause of events, and to recommend improvements designed to prevent recurrence and enhance safety. It would also absorb the current responsibilities of the AEOD.

7.3 Discussion

The Task Force believes that the establishment of an Office of Nuclear Safety within the Commission, in accordance with its recommendation, would achieve the following:

a) It would implement the improvements outlined above to prevent recurrence of events and increase reliability and hence safety of operating nuclear plants.

b) It would increase public confidence in the regulation of operating nuclear plants.

c) It would minimize the potential conflict of interest of NRC arising from its having to investigate and determine the cause of an event to which its own regulatory or compliance activities might have been contributing factors. It is acknowledged that this recommendation is based upon perception of a potential conflict of interest rather than on any actual evidence of a conflict of interest.

There exists a diversity of opinion regarding the need for an independent safety organization in the technical community of the nuclear industry. This can be seen from the letters received by BNL provided in Appendix C following the circulation of the first draft of this report in mid-November 1984 to those interviewed in the course of this study. This report has taken into consideration only the comments on factual matters.

The most important features of the operation of this office would be that:

a) It would report to the Commission.

b) It would direct and coordinate a single investigation that would provide the factual basis for both a determination of cause and possible regulatory, licensing, or enforcement action.

c) It would use a party system for investigation.

d) It would be responsible for receiving notification of safety-related incidents and evaluating their significance, and would make use of a system of designated representatives at utilities for the identification of significant events.

e) It would have the power to conduct public hearings on the facts of the incident, to subpoena evidence and witnesses, and order the preservation of evidence.

f) It would be solely responsible for the determination of the cause of an incident.

g) It would issue recommendations at the conclusion of its deliberations for the prevention of a recurrence of the incident and require a response from the regulatory, licensing, and enforcement side of NRC within a specified time, with both the recommendations and response being made public through a medium such as the Federal Register.

h) It would assume the responsibilities and functions of the current Office of Analysis and Evaluation of Operational Data.

i) It would have, initially, an estimated 30 technical professionals (15 stationed at Headquarters and 15 distributed at the five NRC Regional Offices) to direct and conduct investigations and determine the cause of the expected 8-12 significant events per year occurring over the next three to four years when the number of operating nuclear plants will be about 85-100. The addition of these 30 to the currently anticipated staff of 50 at AEOD would provide an initial staff of 80 for the Office of Nuclear Safety. As additional nuclear plants become fully operational and experience is gained in the investigation of events, the personnel requirements might change.

The major difference between the organization being proposed here and the NTSB is that the former would not be completely independent of the regulatory agency. There are several reasons to prefer an office reporting to the Commission. First, the small projected size of an independent NSB for the current 85 plants with operating licenses (a total staff of 112 persons for a single-administrator NSB and 125 for an NSB headed by a board) would make its viability as an independent agency questionable. Because of the limited opportunities for advancement and professional interaction, it would be difficult to attract and retain qualified people. Second, separating the investigatory functions from the licensing, regulatory, and compliance functions would provide sufficient independence and visibility to ensure objective fact-finding and serious and timely consideration of its recommendations. Third, communications between a totally independent agency and NRC would be difficult to maintain, especially on the informal level essential for effective and efficient operation.

In any event, the case for a totally independent investigatory agency is less compelling in the nuclear than in the aviation field. Unlike the NRC, the FAA has by law both a promotional and an operational role (through its operation of the Air Traffic Control system and the system of navigational aids and the dissemination of weather data) as well as a regulatory one. This means that it can be the direct cause of an accident in a way that NRC cannot, and therefore has a potentially greater conflict of interest in investigating an accident to determine cause. Also unlike NRC, the FAA is headed by a single administrator, making it more prone to domination by a single point of view. This possibility increases the need for total independence of the investigative organization in the case of the aviation industry. If the NRC were to be replaced by an agency with a single administrator as has been proposed, the question of total independence of the investigative agency should be reconsidered.

On balance, taking all these pros and cons into account, it is our judgment that the type of organization and system proposed has the best chance of improving the effectiveness and efficiency of investigations of incidents.

If the number of technical staff required for full field investigations increases significantly due to the complexity of the investigations or substantial increase in the number of significant events per year, or if a greater oversight role over the NRC is deemed desirable, or if the present Commission is replaced by a single administrator, then the establishment of an agency totally independent of the NRC, called here the NSB, should be considered. This progressive development towards greater independence would be similar to the history of the NTSB which, at its inception as an agency for investigating all transportation accidents, was a part of the Department of Transportation, and earlier, when it was responsible only for aviation accidents, part of the Bureau of Air Commerce.

If there is need for increased oversight over the NRC activities, an alternative would be to expand the statutory scope of the ACRS and give it oversight responsibilities. An investigation of this issue is, however, outside the scope of the present study.

APPENDIX A

THE NUCLEAR SAFETY BOARD

A Study of the Powers and Authorities Needed by, and the Legislative Authority Needed to Create, an Independent Organization Responsible for Investigating Nuclear Accidents and Operating Incidents

Prepared for Brookhaven National Laboratory pursuant to Contract Number 174599-S

by Marcus A. Rowden and Sam E. Fowler
Fried, Frank, Harris, Shriver & Kampelman

October 12, 1984

TABLE OF CONTENTS

INTRODUCTION

Background

This report examines the powers and authorities that might be exercised by, and the additional legislative authority that would be needed to establish, an independent organization to conduct investigations of significant safety events, including significant operating incidents, at facilities licensed by the U.S. Nuclear Regulatory Commission (NRC). For convenience, this organization is referred to throughout the report as the "Nuclear Safety Board."

The idea of a Nuclear Safety Board was first proposed in November 1977 by Dr. Harold W. Lewis, Professor of Physics at the University of California, in a letter to Rep. Morris K. Udall, Chairman of the House Committee on Interior and Insular Affairs. Dr. Lewis recommended the creation of an independent, quasi-judicial organization to review and analyze nuclear accident precursors and to recommend corrective actions to prevent similar or more serious events in the future. Dr. Lewis based his proposal on the National Transportation Safety Board (NTSB), which investigates transportation accidents independent of the Department of Transportation (DOT), and recommends corrective measures to DOT.1/

1/ H. Rep. No. 96-1382, Part II, 96th Cong., 2d Sess. 30 (1980).

Interest in an NTSB-type Nuclear Safety Board intensified after the Three Mile Island accident. The report of the NRC's Special Inquiry Group (the Rogovin report) on the TMI accident recommended creation of an independent, five-member "Nuclear Safety Board," to investigate major nuclear accidents and important safety-related incidents. The Rogovin proposal envisioned a much larger role for its Nuclear Safety Board, however, than that played by the NTSB or that contemplated by Dr. Lewis. The Rogovin proposal called for the Board to "provid[e] a quality assurance function for the [NRC's] regulatory process as a whole," to oversee the effectiveness of the NRC's licensing review and regulatory processes, and to advise the NRC on regulatory goals and important issues for rulemaking.2/

2/ NRC Special Inquiry Group, Three Mile Island: A Report to the Commissioners and to the Public, vol. 1, pp. 117-119 (1980).

The President's Commission on the Accident at Three Mile Island (the Kemeny Commission) recommended the creation of an "oversight committee on nuclear safety" to "examine, on a continuing basis, the performance of the [NRC] and of the nuclear industry in addressing and resolving important public safety issues associated with the construction and operation of nuclear power plants, and in exploring the overall risks of nuclear power." Report of the President's Commission on the Accident at Three Mile Island, The Need for Change: The Legacy of TMI, p.62 (1979). In 1980, President Carter implemented this recommendation in part by establishing a Nuclear Safety Oversight Committee, on a temporary basis, to advise on the progress made in improving safety and implementing certain post-TMI reforms. Executive Order 12202, Weekly Compilation of Presidential Documents, vol. 16, p. 504 (March 18, 1980). Neither the oversight committee contemplated by the Kemeny Commission nor that appointed by President Carter was authorized to investigate accidents or significant operating events, and, thus, neither will be considered further in this report.

The first legislative proposal for a Nuclear Safety Board appear in H.R. 5775, which was introduced in the 96th Congress on November 1, 1979 by Representative Mickey Edwards. In January 1980, Rep. Udall reintroduced H.R. 5775 as Title IV of H.R. 6390, a comprehensive package of amendments to the Atomic Energy Act of 1954.3/ As initially introduced, the Edwards-Udall proposal contemplated that the Nuclear Safety Board would be an independent agency, and that it would oversee the performance of the NRC and monitor that agency's resolution of unresolved safety issues, as well as investigate nuclear accidents and analyze operating data. In September 1980, the House Interior Committee reported the Edwards-Udall proposal for an independent Nuclear Safety Board, but narrowed its functions. As reported by the Interior Committee, H.R. 6390 would have authorized the Board to conduct investigations of nuclear safety incidents and recommend safety improvements to the NRC, but the Board would not have had the authority, originally proposed by Reps. Edwards and Udall, to oversee the performance of the NRC or to monitor that agency's resolution of safety issues.4/ H.R. 6390 was, however, never enacted. Rep. Edwards introduced another bill (H.R. 2303) to establish a Nuclear Safety Board the following year, but no action was taken on that proposal.

3/ H. Rep. No. 96-1382, Part II, 96th Cong., 2d Sess. 30 (1980).

4/ Id. at 32. The text of the two provisions, which was eliminated by the House Interior Committee would have authorized the Board to monitor the NRC's performance and its resolution of safety issues, is set forth in Appendix C to this report.

On June 21, 1984, Senator Joseph R. Biden introduced an amendment to the Fiscal Year 1985 Energy and Water Development Appropriations Bill (later enacted as Public Law 98-360), to require the NRC to report to the Congress on the "feasibility of establishing an independent nuclear safety board that would do the investigatory followup of incidents at nuclear powerplants." Although Senator Biden declined to prejudge the organizational form the Board should take (and, indeed, indicated that the NRC study should consider establishing the board within, as well as independent of, the NRC), he stated that he had the National Transportation Safety Board in mind while drafting the amendment. In addition, Senator Biden cited, with approval, the Edwards-Udall proposal for a Nuclear Safety Board.5/

Senator Biden's amendment became the basis of the requirement, which appears in the Conference Report accompanying Public Law 98-360, that NRC conduct a study of the need for, and feasibility of, a Nuclear Safety Board.6/

Scope of the Report

This report, prepared under contract for the Brookhaven National Laboratory, is but one part of a comprehensive study of the feasibility, desirability, and scope of the contemplated Nuclear Safety Board that is being conducted by the Brookhaven National Laboratory for the NRC in implementation of Public Law 98-360.

5/ 130 Cong. Rec. S7931-S7933 (June 21, 1984).

6/ H.Rep. No. 98-866, 98th Cong., 2d Sess. 81-82 (1984).

The scope of this report is limited to consideration of the powers and authorities that would be needed by, and the additional legislative authority required to create, an independent Nuclear Safety Board. Consideration of these matters, however, depends upon the organization of, and the functions to be performed by the Nuclear Safety Board. Thus, while consideration of the alternative organizational forms and possible functions of the Nuclear Safety Board is beyond the scope of this report, we have found it necessary to establish basic parameters for the form and functions of the Board in order to assess the powers and authorities it might need and the additional legislative authority required to establish such a Board.

We have assumed, for purposes of this report, that the Nuclear Safety Board would possess an organizational structure and perform functions comparable to the structures and functions of the NTSB and those of the Nuclear Safety Board proposed in H.R. 6390. Thus, while it may be feasible to establish a Nuclear Safety Board within the existing NRC, this report is limited to consideration of an organization established independent of, and outside, the NRC. Similarly, while the organization could be headed by a single official, we have assumed -- in keeping with its characterization as a "board" and its NTSB analogy -- that it would be headed by a multiple member board. Further, while the Rogovin Special Inquiry Group and the original Edwards-Udall proposal contemplated that the Board would exercise general oversight responsibility as respects performance of the NRC, we have limited our consideration to the powers and authorities needed by, and the legislative authority required to create, an organization whose primary function would be to investigate accidents and operating incidents and which would perform only limited collateral duties. Finally, we have assumed that the organization would focus on significant safety events, and would not be responsible for investigating incidents involving physical security of facilities or materials.

Our analysis of the powers and authorities needed by, and the legislative authority required to create, a Nuclear Safety Board relies heavily on the legislation creating the NTSB, the only operating model for a federal safety board which investigates accidents in an industry regulated by another federal agency, and H.R. 6390, the previous legislative proposal to create a Nuclear Safety Board. Thus, the first two sections of this report summarize the NTSB and the Nuclear Safety Board contemplated by H.R. 6390, respectively. The third section examines the powers and authorities, including administrative authorities, necessary or useful to the realization of the Nuclear Safety Board's mission; and the fourth section examines the additional legislation needed to establish the Board.

I

THE NATIONAL TRANSPORTATION SAFETY BOARD

The National Transportation Safety Board (NTSB) provides the only operating model for a Nuclear Safety Board. Although several federal regulatory agencies possess authority to investigate accidents, the NTSB is the only major federal agency that has been created to investigate accidents in an industry regulated by another federal agency.

NTSB was originally established by the Department of Transportation Act of 1966[7/] as an agency within the Department of Transportation (DOT), "to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations."[8/] In 1974, Congress concluded that, because NTSB's mission requires it to make "conclusions and recommendations that may be critical of or adverse to" DOT, NTSB could not "properly perform [its] functions unless it is totally separate and independent from" DOT.[9/] Accordingly, NTSB was reestablished as an independent federal agency pursuant to the Independent Safety Board Act of 1974.[10/]

7/ Public Law 89-670.

8/ 49 App. U.S.C. §1901 (1)(1982).

9/ *Id.* §1901 (2).

10/ The Independent Safety Board Act was incorporated as Title III of the Transportation Safety Act of 1974, Public Law. 93-633, codified at 49 App. U.S.C. §§1901-1907 (1982). The text of the Act, as codified, is set forth in Appendix A to this report.

The Independent Safety Board Act authorizes NTSB to investigate, or cause to be investigated, and to determine the cause of all U.S. civil aviation accidents, certain highway, railroad, pipeline, and maritime accidents, and any other transportation accident that, "in the judgment of the Board, is catastrophic, involves problems of a recurring character, or would otherwise carry out the policy" of the Independent Safety Board Act.11/ The Act expressly permits NTSB to request DOT to conduct accident investigations "and to report to the Board the facts, conditions, and circumstances thereof (except in accidents where misfeasance or nonfeasance by the Federal Government is alleged)." Even where DOT performs the accident investigation, however, NTSB determines the cause or probable cause of the accident, based upon the DOT report.12/

Both NTSB and DOT are responsible for investigating transportation accidents. NTSB investigates accidents to determine probable cause and proposes recommendations to improve transportation safety. DOT establishes transportation regulations and standards and investigates accidents to determine if DOT regulations and standards were violated and to determine if improvements in such regulations and standards

---

11/ 49 App. U.S.C. §1903 (a)(1) (1982).

12/ *Id.* *See also* 49 App. U.S.C. §1441(f) and (g) (1982).

are required.13/

NTSB is also authorized to:

- publish reports on specific accident investigations;

- "issue periodic reports to the Congress, Federal, State, and local agencies ... recommending and advocating meaningful responses to reduce the likelihood of recurrence of transportation accidents ... and proposing corrective steps to make the transportation of persons as safe and free from risk of injury as is possible";

- initiate and conduct special studies and investigations;

- assess accident investigation techniques and recommend accident investigation procedures;

- establish binding accident and aviation incident reporting requirements;

- "evaluate, assess the effectiveness, and publish the findings of the Board with respect to the transportation safety consciousness and efficacy in preventing accidents of other Government agencies [e.g., DOT]";

- "evaluate the adequacy of safeguards and procedures concerning the transportation of hazardous materials and the performance of other Government agencies charged with assuring the safe transportation of such materials"; and

- review on appeal the suspension, amendment, modification, revocation, or denial of certain operating certificates or licenses issued by DOT.14/

To fulfill these responsibilities, NTSB is empowered, among other things, to:

- conduct hearings, and compel the attendance and testimony of witnesses and the production of evidence;

13/ Reimbursable Memorandum of Agreement Between DOT and NTSB, executed May 5, 1975 (by DOT) and May 15, 1975 (by NTSB).

14/ 49 App. U.S.C. §1903 (a) (2)-(9) (1982).

- enter property and inspect documents and facilities in furtherance of accident investigations;

- obtain judicial enforcement of its orders and inspection notices;

- enter into contracts necessary to the conduct of its functions;

- obtain autopsy reports;

- obtain the services, equipment, personnel, and facilities of DOT and other federal, state, and local agencies; employ experts and consultants; and appoint advisory committees;

- conduct inquiries and require the submission of written reports and the answers to questions; and

- establish regulations necessary to the exercise of its functions,15/ including regulations preserving the remains of aircraft involved in accidents.16/

Further, the Independent Safety Board Act requires the Secretary of Transportation to respond to every transportation safety recommendation made by NTSB within ninety days after receipt. The response must indicate whether or not DOT intends to adopt the recommendation, in whole or in part. If DOT indicates that it intends to adopt the recommendation, or any part thereof, the response must set forth a timetable for the implementation of the recomendation. If DOT declines to adopt an NTSB recommendation, or any part thereof, DOT must state in detail the reasons for such refusal. Further, a 1981 amendment to the Independent Safety Board Act requires DOT to submit an annual report to Congress setting forth all NTSB

15/ Id. §1903(b).

16/ Id. §1441(d).

recommendations received during the prior year and DOT's response thereto.17/

In 1981, Congress amended the Independent Safety Board Act of 1974 to clarify the NTSB's authority.18/ Among other things, the 1981 amendments expressly provided that the NTSB has priority over other federal agencies in conducting accident investigations (except investigations of marine accidents). Although this change was intended to reduce duplicate federal accident investigations, the amendment expressly provided that it was not intended to preclude DOT from conducting its own investigation or from obtaining information from parties or witnesses to an accident.19/ In addition, the amendments expanded the NTSB's reporting requirements to include "aviation incidents" as well as aviation accidents,20/ and clarified the NTSB's authority to examine and test "any vehicle, rolling stock, track, or pipeline component" in the course of Board investigations.21/

17/ *Id.* §1906.

18/ Independent Safety Board Act Amendments of 1981, Public Law 97-74. *See* 1981 U.S. Code & Cong. Admin. News 1730.

19/ 49 App. U.S.C. §1903 (a)(1) (1982).

20/ *Id.* §1903 (a)(6).

21/ *Id.* §1903(b)(2).

II

H.R. 6390

The authors of H.R. 6390 closely patterned their proposal for a Nuclear Safety Board after the NTSB, although taking into account the differences between nuclear and transportation safety.22/ Echoing the reasons cited by Congress for establishing the NTSB as an independent agency, the House Interior Committee "concluded that the advantages of an independent agency outweighed those of a statutory group within the [NRC],"23/ and structured the proposed Nuclear Safety Board accordingly. Unlike the NTSB, which generally investigates accidents in which personal injury or property damage occurs, however, H.R. 6390 contemplated that the Nuclear Safety Board would focus as well upon significant operating events and analyze the implications of such events.24/

H.R. 6390 also copied the duplication of investigative responsibilities characteristic of the NTSB-DOT relationship. While providing the Nuclear Safety Board with authority to investigate nuclear accidents and operating incidents, H.R. 6390 preserved the existing investigative authority of the

---

22/ H.Rep. No. 96-1382, Part II, 96th Cong., 2d Sess. 32 (1980).

23/ Id.

24/ Id; H.R. 6390, 96th Cong., 2d Sess. §204(1). The text of H.R. 6390, as reported by the House Committee on Interior and Insular Affairs, is set forth as Appendix B to this report.

NRC. Moreover, like the Independent Safety Board Act, H.R. 6390 authorized the Nuclear Safety Board to rely on the findings of investigations conducted by the NRC, provided the Board made its own analysis of those findings and drew its own conclusions and recommendations therefrom.25/

In addition to directing the Nuclear Safety Board to investigate nuclear accidents and significant operating events, H.R. 6390 would have authorized the Board to:

- systematically analyze operating data;
- conduct special nuclear safety studies;
- evaluate suggestions for safety improvements;
- recommend specific safety measures to the NRC;
- establish safety reporting requirements;
- issue periodic reports recommending specific nuclear safety measures; and
- establish a monitoring center to analyze operating data and provide advice to nuclear powerplant operators during emergency situations.26/

Unlike the NTSB vis-a-vis DOT, however, the Nuclear Safety Board envisioned by H.R. 6390 would not have reviewed on appeal the suspension, amendment, modification, revocation, or denial of any permit or license issued by the NRC.

25/ H.R. 6390 §204(1)

26/ *Id.* §204 (2)-(8).

To fulfill the Board's responsibilities, H.R. 6390 would have authorized the Board, among other things, to:

- conduct hearings,27/ and compel the attendance and testimony of witnesses and the production of evidence;28/
- enter property and inspect documents and facilities in furtherance of accident investigations;29/
- obtain autopsy and medical reports;30/
- establish regulations necessary to the exercise of its functions,31/ impose civil penalties for violation of its reporting requirements,32/ and obtain judicial enforcement of its orders;33/
- grant immunity to witnesses;34/
- enter into contracts necessary to the conduct of its functions;35/
- obtain services, equipment, personnel and data from the NRC and other federal, state, and local agencies,36/ employ experts and consultants,37/ and appoint advisory committees.38/

27/ *Id*. §205(a).

28/ *Id*. §205(b).

29/ *Id*. §205(c).

30/ *Id*. §205(d).

31/ *Id*. §206(f).

32/ *Id*. §210.

33/ *Id*. §205(e).

34/ *Id*. §205(f).

35/ *Id*. §206(c).

36/ *Id* §203(c)-(d); §206(a).

37/ *Id*. §203(b).

38/ *Id*. §206(e).

Further, H.R. 6390 would have required the NRC to respond to every safety recommendation made by the Nuclear Safety Board within ninety days after receipt. The response would have been required to indicate whether the NRC intended to adopt the recommendation, in whole or in part. If the NRC indicated it would adopt the recommendation, or any part thereof, the response would have been required to set forth a timetable for implementation of the recommendation. If the NRC declined to adopt the recommendation, or any part thereof, it would have had to state in detail the reasons for such refusal.39/

39/ *Id*. §209.

III

POWERS AND AUTHORITIES

Investigative Powers

Based upon the Conference Report accompanying Public Law 98-360, the principal function of the Nuclear Safety Board would be to conduct "investigations of significant safety events, including significant operational incidents, at facilities licensed by the [NRC] and [to make] reports of such investigations."40/ The purpose of these investigations, based upon H.R. 6390, would be (a) "to ascertain information concerning the circumstances of the event involved, and its implications for the public health and safety; and [b] to determine whether such event is part of a pattern of similar events ... which could significantly affect the public health and safety or which could be the precursor of events which could significantly affect the public health and safety."41/

To fulfill this function, the Nuclear Safety Board would require, in addition to general authority to investigate significant nuclear safety events, the following specific investigative powers:

1. Authority to Conduct Hearings. The Board would require authority to hold evidentiary hearings, take testimony, receive evidence, administer oaths to witnesses, and pay

40/ 130 Cong. Rec. H.6979 (June 26, 1984).

41/ H.R. 6390 §204(1). Based upon the statement made by Senator Biden in introducing the Nuclear Safety Board amendment, the Board would not assign the cause or probable cause of nuclear accidents "in an adjudicatory sense." 130 Cong. Rec. S7932 (June 21, 1984).

witnesses' expenses. In addition, the Board would need authority to issue subpoenas to compel the attendance and testimony of witnesses and the production of evidence pertaining to matters under investigation.42/

2. Inspection Authority. The Board would require authority to enter any facility licensed or regulated by the NRC, or any property containing materials licensed or regulated by the NRC, where a significant nuclear safety event has occurred. The Board also would need authority to inspect all records, files, papers, processes, controls, and facilities relevant to an investigation of an event.43/

The Board's inspection authority would, of course, be limited by the Fourth Amendment's guarantee against "unreasonable searches and seizures." Indeed, the Supreme Court has held unconstitutional the statutory authority of the Occupational Safety and Health Administration (OSHA) to enter workplaces and to inspect and investigate working conditions, to the extent the statute purports to authorize warrantless, unconsented searches.44/

Nonetheless, the Independent Safety Board Act does not require the NTSB to obtain a warrant prior to gaining entry or access to transportation accident sites, wreckage, or

---

42/ *See* 49 App. U.S.C. §1903(b)(1); H.R. 6390 §205(a)-(b).

43/ *See* 49 App. U.S.C. §1903(b)(2); H.R. 6390 §205(c).

44/ *Marshall* v. *Barlow's, Inc.*, 436 U.S. 307 (1978) (construing 29 U.S.C. §657 (a)).

records,45/ and the NTSB's inspection rights have not been challenged.46/ Similarly, the Atomic Energy Act does not require the NRC to obtain warrants to inspect facilities licensed by that agency,47/ and H.R. 6390 would not have required its Nuclear Safety Board to have obtained search warrants to conduct its investigations.48/ Moreover, in 1981, the Supreme Court distinguished the previously mentioned OSHA case, and upheld the authority of the Mine Safety and Health Administration (MSHA) to conduct warrantless searches.49/ The Court based its decision on, among other things, the fact that the mining industry is pervasively regulated and inspected,50/ and the fact that when MSHA inspectors are refused entry they must seek a court injunction against further refusals rather than force their entry.51/

45/ 49 App. U.S.C. §1903(b)(2).

46/ Telephone conversation with David Bass, Senior Attorney, Office of General Counsel, National Transportation Safety Board, October 9, 1984.

47/ 42 U.S.C. §2201 (o). See also 10 C.F.R. §50.70.

48/ H.R. 6390 §205(c).

49/ Donovan v. Dewey, 452 U.S. 594 (1981).

50/ 452 U.S. at 603, quoting United States v. Biswell, 406 U.S. 311, 316 (1972) (holding that the Gun Control Act of 1968 provided a sufficiently comprehensive and predictable inspection scheme that warrantless searches are permissible). See also Colonnade Catering Corp. v. United States, 397 U.S. 72 (1970) (holding that because the alcoholic beverage industry has long been "subject to close supervision and inspection," warrantless searches are permissible).

51/ 452 U.S. at 604.

Nuclear Safety Board inspections would appear to fall within the Supreme Court's rationale in the MSHA case. Like the mining industry, the nuclear industry is subject to comprehensive and pervasive regulation and inspection. In addition, the inspection authority proposed by H.R. 6390 would have been restricted to NRC-licensed facilities or property in which a nuclear safety event has occurred or to records and materials "relevant to the investigation" of a nuclear accident; and, if refused access, the Board would be required to seek a court order to gain such access (see the following section on "Enforcement Authority").52/ Accordingly, it appears that the Board's inspection authority would not violate the Fourth Amendment's guarantee against unreasonable searches, provided such authority contains the restrictions incorporated in H.R. 6390.

3. Enforcement Authority. The Board would require adequate authority to enforce its investigative powers. In the event any person fails to comply with a Board subpoena or other order, or to submit to a Board inspection, the Board should be authorized to obtain a federal court order compelling the person to comply with such subpoena or order, or to submit to such inspection. Furthermore, the Board should be authorized to seek contempt citations against any person who fails to

---

52/ H.R. 6390 §205(c).

comply with a court order.53/

4. Authority to Obtain Autopsy and Other Medical Information. The Board would require authority to order autopsies, or to obtain copies of reports on autopsies performed by State or local officials, on persons who may have died as a result of having been involved in a nuclear accident. In addition, because a nuclear accident may result in non-fatal radiological injuries, the Board would need authority to obtain the results of any medical tests performed on persons injured in nuclear accidents, subject to appropriate consent.54/

5. Authority to Grant Immunity. The Board would require authority to grant immunity to witnesses under sections 6002 and 6004 of title 18 of the United States Code where necessary to obtain information material to a Board investigation. Section 6004 authorizes federal agencies, with the approval of the Attorney General, to issue orders requiring persons to give testimony or otherwise provide information despite the person's claim of privilege against self-incrimination, provided that the agency believes that the testimony or information may be necessary to the public interest.

53/ *See* 49 App. U.S.C. §1903(b)(3); H.R. 6390 §205(e).

54/ *See* 49 App. U.S.C. §1903(b)(5)(autopsy reports only); H.R. 6390 §205(d)(autopsy and medical reports).

Section 6002 provides that testimony or other information compelled under a Section 6004 order may not be used against the witness in any criminal case, except for a prosecution for perjury, giving a false statement, or otherwise failing to comply with the Section 6004 order.55/

In addition, it may be advisable to prohibit the admission into evidence of any report or recommendation issued by the Board relating to any nuclear accident or Board investigation, in any action for damages arising from any matter mentioned in this report. Such a prohibition, which appears in the Independent Safety Board Act, would facilitate the Board's ability to collect material information about nuclear accidents or events from persons who might otherwise withhold information to avoid potential liability for damages to third parties.56/

6. Authority to Obtain Official Data. The Board would need authority to secure from other agencies of the Federal Government any information that might be necessary to the Board's functions. H.R. 6390 contemplated that this authority would include classified and safeguards information otherwise

---

55/ *See* H.R. 6390 §205(f)(1). In lieu of expressly providing the authority to grant immunity in the statute establishing the Nuclear Safety Board, 18 U.S.C. §6001, which defines "agency of the United States" for purposes of sections 6002 and 6004, could be amended to include the Nuclear Safety Board. The National Transportation Safety Board, for example, possesses authority to grant immunity as a result of being expressly defined as an "agency of the United States" in 18 U.S.C. §6001, rather than as a result of a provision in the Independent Safety Board Act.

56/ 49 App. U.S.C. §1903(c); *see also* H.R. 6390 §205(f)(2).

protected from disclosure under the Atomic Energy Act of 1954.57/ In addition, consideration should be given to extending this access authority to unclassified information disclosure of which is prohibited by section 148 of the Atomic Energy Act.58/

Notwithstanding the foregoing authority, unless otherwise provided, the Board's ability to obtain information from other federal agencies would be limited by the Privacy Act of 1974, which establishes standards and procedures restricting the disclosure of information about individuals maintained

---

57/ H.R. 6390 §206(a). Section 227 of the Atomic Energy Act of 1954 restricts the disclosure of information classified as "Restricted Data." 42 U.S.C. §2277. "Restricted Data" includes "all data concerning (1) design, manufacture, or utilization of atomic weapons; (2) the production of special nuclear material; or (3) the use of special nuclear material in the production of energy," unless it has been declassified. 42 U.S.C. §2011(y). Most information relating to licensed civil uses of nuclear energy is unclassified (although information properly designated as proprietary may be withheld from public disclosure if specified conditions are met). Section 147 of the Atomic Energy Act does, however, prohibit the "unauthorized disclosure of safeguards information which specifically identifies [an NRC] licensee's or applicant's detailed ... security measures. ..." 42 U.S.C. §2167.

58/ Section 148 of the Atomic Energy Act authorizes DOE to issue regulations or orders prohibiting the unauthorized disclosure of unclassified information pertaining to: (a) the design of production or utilization facilities; (b) security measures for the physical protection of nuclear material or facilities; and (c) declassified weapons information. 42 U.S.C. §2168. Section 148 was added to the Atomic Energy Act by section 210(a)(1) of Public Law No. 97-90, which was enacted on December 4, 1981. Thus, it was not referred to in H.R. 6390, which was drafted and reported in 1980.

by a federal agency.59/ The Privacy Act permits disclosures to certain specified agencies (e.g., the Census Bureau, the National Archives, the General Accounting Office, and agencies performing a civil or criminal law enforcement activity) for certain specified purposes, but it appears that none of the statutory exemptions would permit the NRC or other federal agencies to disclose information about an individual to a Nuclear Safety Board, except in accordance with the statutory conditions on disclosure. Although H.R. 6390 expressly provided that its Nuclear Safety Board's access to information would be limited by the Privacy Act, consideration should be given to exempting the Nuclear Safety Board from such restrictions.

7. Authority to Establish Reporting Requirements. The Board would also need authority to require persons involved with the construction or operation of nuclear facilities to submit reports on significant nuclear events or significant operating incidents. H.R. 6390 would have applied such reporting requirements to:

> (A) persons who operate, design, supply, maintain, or are otherwise involved with the operation or construction of, facilities licensed or otherwise regulated by the [NRC];

59/ 5 U.S.C. §552a (1982). The Privacy Act provides that "[n]o agency shall disclose any [personal] record which is contained in a system of records by any means of communication to any person, or to another agency, except pursuant to a written request by, or with the prior written consent of, the individual to whom the record pertains," except under certain specified circumstances.

> (B) persons who process, store, transport, use, or possess materials licensed or otherwise regulated by the [NRC]; and
>
> (C) persons who export nuclear equipment pursuant to any license or permit issued by the [NRC].

H.R. 6390 expressly contemplated that this reporting requirement would have extended to classified and safeguards information otherwise protected from disclosure under the Atomic Energy Act.60/ As in the case of information obtained from other federal agencies (discussed in section 6 above), however, consideration should be given to extending the Board's access authority to unclassified information which otherwise may not be disclosed under Section 148 of the Atomic Energy Act.

8. Authority to Impose Civil Penalties. If the Board is given authority to establish reporting requirements, it should also be authorized to impose civil penalties, up to a certain monetary limit, for violations of such requirements.

The NRC currently possesses authority to require a wide range of reports from persons licensed or regulated by that agency. Section 161o. of the Atomic Energy Act of 1954 authorizes the NRC to "require by rule, regulation, or order, such reports, and the keeping of such records with respect to [activities licensed by the NRC] ... as may be necessary to effectuate the purposes of [the Atomic Energy] Act."61/ In

---

60/ H.R. 6390 §204(6). See also 49 App. U.S.C. §1903(a)(6).

61/ 42 U.S.C. §2201(o). See, e.g., 10 C.F.R. §§50.72 and 50.73 (1984).

addition, section 206 of the Energy Reorganization Act of 1974 requires:

> Any individual director, or responsible officer of a firm constructing, owning, operating, or supplying the components of any facility or activity which is licensed or otherwise regulated [by the NRC] ... who obtains information reasonably indicating that such facility or activity or basic components supplied to such facility or activity--
>
> > (1) fails to comply with the Atomic Energy Act ... or any appliable rule, regulation, order, or license of the Commission relating to substantial safety hazards, or
> > (2) contains a defect which could create a substantial safety hazard ...
>
> [to] immediately notify the Commission of such failure to comply, or such defect 62/

Failing to submit a required report may be punished by a fine of $100,000 per day of violation.63/

H.R. 6390 and the Atomic Energy Act offer alternative mechanisms for the imposition and collection of civil penalties. H.R. 6390 would have authorized its Nuclear Safety Board to conduct adjudicatory hearings to determine whether to impose such penalties.64/ Section 234 of the Atomic Energy Act, on the other hand, provides that the NRC is to notify in writing persons subject to its authority of an alleged violation and

---

62/ 42 U.S.C. §5846 (a).

63/ 42 U.S.C. §§2282(a) and 5846(b).

64/ *See* H.R. 6390 §210.

the amount of any penalty the NRC proposes to impose. The person may show, in writing, why such penalty should not be imposed; and the NRC thereafter establishes the final amount of the penalty.65/

H.R. 6390 would have authorized the Board to "compromise, modify, or remit" civil penalties it imposes.66/ The NRC has comparable authority under section 234 of the Atomic Energy Act.67/ While H.R. 6390 was silent on the collection of civil penalties, section 234 provides that "[o]n the request of the Commission, the Attorney General is authorized to institute a civil action to collect a penalty imposed pursuant to this section." Thereafter, "[t]he Attorney General shall have the exclusive power to compromise, mitigate, or remit such civil penalties as are referred to him for collection."68/

The NTSB does not possess authority to assess civil penalties.

9. Authority to Preserve Evidence. The NTSB has specific statutory authority to prescribe regulations to preserve "[a]ny civil aircraft, aircraft engine, propeller, appliance, or property aboard an aircraft involved in an accident in air commerce."69/ In addition, federal law imposes criminal

---

65/ 42 U.S.C. §2282(b).

66/ H.R. 6390 §210(c).

67/ 42 U.S.C. §2282(a).

68/ Id. §2282(c).

69/ 49 App. U.S.C. §1441(d) (1982).

penalties on "[a]ny person who knowingly and without authority removes, conceals, or withholds any part of a civil aircraft involved in an accident, or any property which was aboard such aircraft at the time of the accident."70/ Although the Atomic Energy Act does not contain similar provisions specifically addressing evidence of nuclear accidents or operating incidents, the NRC does possess broad authority to "prescribe such regulations or orders as it may deem necessary ... to govern any activity authorized pursuant to [the Atomic Energy] Act... in order to protect health and to minimize danger to life or property."71/

It may be desirable to authorize the Nuclear Safety Board to adopt regulations designed to protect evidence of accidents or incidents under investigation, or which may be investigated, by the Board. Any such authority would, of course, have to be carefully drafted so as not to prohibit or impede taking such actions as may be necessary to protect health and safety of the public.

Collateral Investigative Powers

In addition to being accorded all powers necessary to conduct investigations of significant nuclear safety events, the Nuclear Safety Board should have the authority to determine which events or operating incidents warrant Board investigation and to request the NRC to conduct investigations for the Board.

70/ Id. §1472(p).

71/ 42 U.S.C. §2201(i).

10. Authority to Determine Which Events Warrant Investigation. The Independent Safety Board Act of 1974 defines the types of accidents that the NTSB is authorized to investigate with relative specificity. For example, that Act requires the NTSB to investigate only those railroad accidents in which "there is a fatality, substantial property damage, or which involves a passenger train."72/ Plainly, the Nuclear Safety Board's charter, if it is to meet what we understand to be the legislative aim, cannot be similarly confined -- that is, to accidents involving personal injury or offsite property damage. Other types of incidents may pose significant implications for the public health and safety and yet involve no personal injury or property damage. On the other hand, the Board cannot be expected to investigate each of the approximately 4,500 licensee event reports received by the NRC each year.73/

Accordingly, the Nuclear Safety Board should be authorized to determine which events warrant investigation. H.R. 6390 would have authorized the Board to investigate those events "which the board determines to be significant because of possible effects on the health or safety of the public or because such events could be the precursors of events affecting

---

72/ 49 App. U.S.C. §1903(a)(1)(C).

73/ Licensee event reports (LERs) are the written reports NRC licensees are required to submit to NRC reporting any unplanned operational event which has safety implications. The NRC's 1983 Annual Report stated that about 4,500 LERs were received by NRC during fiscal year 1983. U.S. NRC, 1983 Annual Report, p. 41 (June 1984).

the health or safety of the public."74/

11. Authority to request the NRC to perform investigations. Although the Nuclear Safety Board would need to be empowered and equipped to conduct its own investigations of nuclear accidents and operating events, the Board should be allowed to request the NRC to perform initial investigations and to report the facts, conditions, and circumstances of the accident or event to the Board. The Board, however, should be required to independently analyze the NRC findings for purposes of making its own conclusions and recommendations.75/ Such an arrangement balances the objectives of efficient resource utilization with that of investigative independence, and would be consistent with the DOT-NTSB practice.76/

The 1981 amendments to the Independent Safety Board Act give NTSB investigations priority over those of other federal agencies.77/ Congress found that designating NTSB the lead agency for transportation accident investigations was necessary to prevent duplicate investigations and dispute over jurisdiction.78/ Consideration should be given to such a course for Nuclear Safety Board investigations, provided that the

---

74/ H.R. 6390 §204(1).

75/ See H.R. 6390 §204(1).

76/ See 49 App. U.S.C. §1903(a)(1). See also 49 App. U.S.C. §1441(g) (prohibiting DOT from participating in the NTSB's determination of probable cause of transportation accidents).

77/ 49 App. U.S.C. §1903(a)(1)

78/ 1981 U.S. Code & Cong. Admin. News 1736.

primacy of Board investigations would not compromise the effectiveness of NRC's basic regulatory responsibilities.

Additional Substantive Powers

H.R. 6390 would have authorized its Nuclear Safety Board to analyze operational safety data from NRC-licensed activities -- the function now performed by the NRC's Office for Analysis and Evaluation of Operational Data (AEOD) -- and to recommend to the NRC "improvements in licensing and related regulatory practices," in addition to investigating significant nuclear events. If Congress adopts a similar role for the Nuclear Safety Board, the Board would require the following additional powers:

12. Authority to Analyze Operating Data. The Board would require authority to collect, systematize, and analyze operational safety data from facilities licensed or otherwise regulated by the NRC for the purpose of determining whether there exist patterns of events that indicate safety problems -- the function currently performed by AEOD.79/ A decision to charge the Nuclear Safety Board with this responsibility would, of course, necessitate reconsidering the role of the AEOD.

79/ See H.R. 6390 §204(2). AEOD was established in October 1979 "to analyze and evaluate operational safety data associated with all NRC-licensed activities and to feed back the lessons of experience in order to improve safety in all licensed operations." U.S. NRC, 1980 Annual Report, p. 91 (1981). Although the AEOD is independent of the staff program offices, it is itself a staff-level office within the NRC and it reports to the Executive Director for Operations.

13. Authority to Conduct Special Studies. The Board would require authority to conduct special studies pertaining to nuclear safety.80/

14. Authority to Evaluate Suggestions. H.R. 6390 also would have expressly authorized the Board to "evaluate suggestions received from the scientific and industrial communities, and other knowledgeable sources, on specific measures to improve safety at facilities, or involving materials, licensed or otherwise regulated" by the NRC.81/

15. Authority to Make Recommendations. The Board would require authority to recommend to the NRC specific measures that should be adopted to minimize the likelihood of occurrence of nuclear accidents, significant safety events, or operating incidents.

To ensure that the NRC would give proper attention to Board recommendations, H.R. 6390 would have required the NRC to submit to the Board a written response to each Board recommendation within ninety days of the NRC's receipt of the recommendation. Further, H.R. 6390 would have compelled the NRC to indicate in its response whether the Commission intended to conduct procedures for adopting such recommendation in whole or in part. With respect to any recommendation that the NRC declined to adopt in its entirety, the Commission would have been required to explain, in detail, the reasons

---

80/ See 49 App. U.S.C. §1903(a)(4); H.R. 6390 §204(3).

81/ See H.R. 6390 §204(4).

for its decision not to adopt all, or part, of the recommendation. With respect to any recommendation, or part thereof, that the NRC stated it would adopt, the Commission would have been required to establish, and state in its response to the Board, a timetable for implementation of the recommendation. In addition, H.R. 6390 would have required the Nuclear Safety Board to publish notice in the Federal Register of the issuance and content of any recommendation submitted to the NRC, and any NRC response thereto.82/

The Independent Safety Board Act establishes a similar procedure for DOT response to NTSB recommendations. The Independent Safety Board Act goes beyond H.R. 6390, however, in also requiring DOT to report to Congress annually on the recommendations it has received from NTSB during the prior year, and DOT's response thereto.83/

16. Authority to Issue Reports. H.R. 6390 also would have authorized the Board to issue periodic reports recommending "specific measures to reduce the likelihood of occurrence of nuclear events similar to those investigated by the Board and ... corrective steps to make any facilities investigated by the Board as safe as is possible." These reports would be made available to the Congress, to federal, state, and local

---

82/ H.R. 6390 §209.

83/ 49 App. U.S.C. §1906.

government agencies concerned with nuclear safety, and the public.84/

17. Authority to Establish a Monitoring Center. H.R. 6390 also would have authorized the Board to establish a "monitoring center for the purpose of receiving reactor data on an instantaneous or otherwise timely basis from each nuclear powerplant" licensed by the NRC. H.R. 6390 contemplated that the monitoring center would be staffed by officers or employees of the Board. These officers would: (1) analyze data received by the center in order to determine "whether any potentially dangerous situation exists at any of the facilities transmitting the data," and (2) make "appropriate recommendations to the operators of nuclear powerplants when it is determined that such a situation does exist."85/

Administrative Powers of the Board

In order to fulfill its substantive responsibilities, the Nuclear Safety Board would require the following administrative powers:

18. Authority to Appoint Staff. The Board should be given authority to appoint, and fix the salaries of, such officers and employees as are necessary to carry out the powers and duties of the Board,86/ subject to the laws governing the appointment, classification, and pay rates of federal

---

84/ H.R. 6390 §204(7). See 49 App. U.S.C. §1903(a)(3).

85/ H.R. 6390 §204(8).

86/ See H.R. 6390 §203(a).

employees.87/

19. Authority to Delegate. The Board should be authorized to delegate to individual members of the Board, officers, employees, or administrative law judges, the authority to exercise such Board powers as the Board may provide.88/

20. Authority to Retain Experts and Consultants. The Board should also be given authority to procure the services of experts and consultants on a temporary or intermittent basis, in accordance with section 3109(b) of title 5 of the United States Code.89/

21. Authority to Obtain Staff and Support Services from Other Agencies. The Board should be authorized to obtain from the NRC, or any other federal agency (including the General Services Administration), such personnel, facilities, equipment, or other administrative support services as may be necessary or desirable to assist the Board in performing its duties. H.R. 6390 contemplated that such staff would be detailed, and such support services would be made available, on a reimbursable basis, at the Board's request.90/

87/ E.g., 5 U.S.C. Chap. 33, Subchap. I (appointment of federal employees); 5 U.S.C. Chap. 51 (classification of federal employees); and 5 U.S.C. Chap. 53 Subchap. III (pay schedules).

88/ See H.R. 6390 §206(b).

89/ 5 U.S.C. §3109 governs the employment of experts and consultants by federal agencies. See 49 App. U.S.C. §1903(b)(6)(c); H.R. 6309 §203(b).

90/ See H.R. 6390 §203(c). See also 49 App. U.S.C. §1903(b)(6)(A).

The Board should also be authorized to confer with state or local government personnel, and to use, on a reimbursable basis, such services, records, and facilities as state and local governments make available to the Board;91/ and to accept voluntary and uncompensated services.92/

The Board should be authorized to designate representatives to serve on or assist such committees as may be necessary or desirable to maintain liaison with other federal agencies, state and local government agencies, and independent standard-setting bodies carrying out nuclear safety programs or activities.93/

22. Contracting Authority. The Board should be authorized to enter into such contracts, leases, cooperative agreements, or other transactions as may be necessary to perform the Board's responsibilities.94/

23. Authority to Appoint Advisory Committees. The Board should be authorized to appoint advisory committees to assist the Board in performing its responsibilities,95/ pursuant to the Federal Advisory Committee Act.96/

91/ *See* 49 App. U.S.C. §1903(b)(6)(B); H.R. 6390 §203(d).

92/ *See* 49 App. U.S.C. §1903(b)(6)(E); H.R. 6390 §203(f)(1).

93/ *See* 49 App. U.S.C. §1903(b)(8); H.R. 6390 §206(d).

94/ *See* 49 App. U.S.C. §1903(b)(6)(G); H.R. 6390 §206(c).

95/ *See* 49 App. U.S.C. §1903(b)(6)(D); H.R. 6390 §206(e).

96/ 5 U.S.C. App. I.

24. Authority to Establish Rules and Regulations. The Board should be authorized to establish such rules and regulations as may be necessary to fulfill its responsibilities, as defined by the Board's enabling legislation. While the Independent Safety Board Act accords the NTSB broad rulemaking authority,97/ H.R. 6390 limited the scope of the Nuclear Safety Board's rulemaking authority to the Board's reporting functions and to its personnel and other internal administrative affairs.98/

25. Authority to Disclose or Protect Information. The Board should be authorized to make available to the public, upon request and at reasonable cost, copies of "any communication, document, or other item of information received or transmitted by the Board," unless protected from disclosure by the Atomic Energy Act of 1954; section 1905, title 18, of the United States Code; the Freedom of Information Act; or the Privacy Act.99/ As a counterpart, the Board should be authorized to protect from disclosure any classified, unclassified, or safeguards information protected by the Atomic Energy Act of 1954,100/ any confidential information protected under section

---

97/ 49 App. U.S.C. §1903(b)(10).

98/ See H.R. 6390 §206(f)

99/ See 49 App. U.S.C. §1905(a); H.R. 6390 §207(a)(1).

100/ I.e., Restricted Data protected pursuant to Chapter 12, safeguards information protected pursuant to section 147, and certain unclassified information protected pursuant to section 148 of the Atomic Energy Act of 1954. 42 U.S.C. §§2161-2168.

1905, title 18, of the United States Code,101/ and information protected by the Freedom of Information Act102/ and the Privacy Act.103/ Notwithstanding section 1905 of title 18, H.R. 6390 would have authorized disclosure of confidential information otherwise protected by that section, but "only in a manner" designed to preserve confidentiality and only" to (a) federal agencies for official use, (b) Congressional committees, (c) the courts, and (d)

> to the public in order to protect health and safety, after notice to any interested person to whom the information pertains and an opportunity for such person to comment in writing, or orally in closed session, on such proposed disclosure (if the delay resulting from such notice and opportunity would not be detrimental to health and safety).104/

101/ 18 U.S.C. §1905 prohibits federal officers and employees from disclosing any trade secret or confidential information obtained "in the course of [such officer or employee's] employment or official duties or by reason of any examination or investigation made by, or return, report or record made to or filed with, such department or agency or officer or employee thereof...."

102/ 5 U.S.C. §552(b). The Freedom of Information Act protects from disclosure (1) certain national security and foreign policy information; (2) internal agency personnel rules and practices; (3) information specifically protected by statute (*e.g.*, the Privacy Act); (4) trade secrets and other privileged or confidential commercial or financial information; (5) inter- or intra-agency memoranda or letters; (6) personnel and medical files; (7) certain investigatory records; (8) certain reports of agencies regulating financial institutions; and (9) geological and geophysical data.

103/ 5 U.S.C. §552a. *See* note 59 *supra*.

104/ H.R. 6390 §207(b). *See also* 49 App. U.S.C. §1905(b).

26. Miscellaneous Powers. The Nuclear Safety Board should also be authorized to use the U.S. mails "in the same manner and under the same conditions as other departments and agencies of the United States."105/

In addition, the Board might be authorized to accept "gifts or donations of money or other property."106/

Administrative Powers of the Chairman

It will also be necessary to establish the administrative powers of the Chairman of the Board (assuming the organization is structured as a Board). Such administrative powers should include:

27. Authority to appoint and supervise personnel employed by the Board;

28. Authority to organize administrative units established by the Board; and

29. Authority to control the use and expenditure of funds. 107/

Such powers should be vested in the Chairman (rather than exercised by the Board members collegially) to ensure the efficient management of the Board's operations.108/

105/ H.R. 6390 §203(e).

106/ 49 U.S.C. §1903(b)(6)(F); H.R. 6390 §203(f)(2).

107/ See 49 App. U.S.C. §1902(b)(3); H.R. 6390 §202(c)(2).

108/ See, e.g., Senate Committee on Governmental Affairs, Study on Federal Regulation, vol. IV, Delay in the Regulatory Process, pp. 116, 118 (Comm. Print 1977).

IV

LEGISLATIVE AUTHORITY

The Need for Legislation

The Constitution provides that federal offices "shall be established by Law" -- that is, by enacting legislation.109/ In the past, several federal agencies (such as the Environmental Protection Agency) have been created by Presidential reorganization plans without Congressional action, pursuant to a succession of Reorganization Acts. The most recent Reorganization Act110/ expired in April 1980, however, and the President can no longe establish a federal agency without Congressional action.

The Content of Legislation

The specific content of any legislation designed to establish a Nuclear Safety Board would necessarily depend upon the organizational structure chosen (that is, whether headed by a single administrator, or a commission or board), the functions it is designed to perform, and the powers and authorities it would exercise. Assuming that the Nuclear Safety Board would have the basic structure, functions, and

---

109/ U.S. Constitution, Article II, section 2. Congress' power to establish new agencies is found in Article I, section 8, clause 18 of the Constitution, which permits Congress "[t]o make all Laws which shall be necessary and proper for carrying into Execution" the powers of the Federal Government.

110/ The Reorganization Act of 1977, Public Law No. 95-17.

powers and authorities contemplated by H.R. 6390, legislation establishing the Board should include the following elements:

1. Establishment and Organization. The legislation should provide for the establishment of the Board, and specify its status as an independent agency and its composition (that is, the number of members -- or, alternatively, that it is to be administered by a single official). The legislation should also provide for: the appointment, qualifications, confirmation, tenure, removal, and compensation of members and any senior statutory officers; the appointment, duties, and authorities of the Chairman and any Vice Chairman, and the quorum required to conduct business (if the organization is structured as a board or commission); the establishment and role of any statutory staff offices; the availability of support services from the General Services Administration and franking privileges; and the adoption of a judicially recognized seal.111/

The Independent Safety Board Act provides that the NTSB shall consist of five members, appointed by the President and confirmed by the Senate, who serve for five-year terms. No more than three members of the Board may belong to the same political party and no fewer than three must have expertise in the field of accident reconstruction, safety engineering or transportation safety. Three members constitute a quorum for

---

111/ *See* 49 U.S.C. §1902; H.R. 6390 §202.

for transaction of business. Any member may be removed by the President for inefficiency, neglect of duty, or malfeasance in office.

The Chairman and Vice Chairman are designated by the President, with the advice and consent of the Senate, and each serves a term of two years. The Chairman is the chief executive officer of the Board and exercises the Board's executive and administrative functions with respect to (1) the appointment and supervision of personnel; (2) the distribution of business among personnel and administrative units; and (3) the use and expenditure of funds. The Chairman is governed by the general policies established by the Board. The Vice Chairman acts as Chairman in the event of the absence or incapacity of the Chairman, or a vacancy in that office.

The Independent Safety Board Act also provides for the establishment of "bureaus, divisions, or offices to investigate and report on accidents involving each of the following modes of transportation: (A) aviation; (B) highway and motor vehicle; (C) railroad and tracked vehicle; and (D) pipeline"; and such other offices as needed.112/

The classification and pay rates of NTSB members and senior officials are set forth in title 5 of the United States Code, rather than in the Independent Safety Board Act. Title

---

112/ 49 App. U.S.C. §1902.

5 provides that the NTSB Chairman is paid at the Executive Schedule level III rate,113/ and the remaining members are paid at the Executive Schedule level IV rate.114/

H.R. 6390 followed the general outline of the Independent Safety Board Act, but with specific differences. The Nuclear Safety Board proposed by H.R. 6390 would have been composed of only three members, appointed by the President and confirmed by the Senate "from among persons who are not officers or employees of the Federal Government." No more than two members of the Board could have belonged to the same political party, but no technical qualifications were specified. Two members would have been required for a quorum, but the statute permitted one to conduct hearings. Members would have served for six-year terms, but could have been removed for inefficiency, neglect of duty, or malfeasance in office.115/ The President would have been required to submit the initial board nominations to the Senate within ninety days of enactment of H.R. 6390.

The Chairman and Vice Chairman would have been designated by the President, without Senate approval, for two year terms. The powers and duties of the Chairman and Vice Chairman were comparable to their NTSB counterparts. H.R. 6390 specified no statutory offices.

113/ 5 U.S.C. §5314.

114/ *Id.* §5315.

115/ One of the initial Board members would have served for two years, and another initial member would have served a four year term, so that, thereafter, one six-year term would expire every two years.

Salaries for the Board members were provided in H.R. 6390. The Chairman would have been paid at the Executive III rate, and the remaining members at the Executive Level IV rate.116/

2. Duties, Powers, and Authorities of the Board. The legislation should set forth the duties of the Board and provide the substantive and administrative powers and authorities the Board needs to fulfill those duties. (See the discussion in Part III of this report.)

3. Judicial Review. The legislation should provide for judicial review of any order issued by the Board in an appropriate Court of Appeals of the United States or the United States Court of Appeals for the District of Columbia. The Independent Safety Board Act provides for review of NTSB orders in the U.S. Courts of Appeals, as did H.R. 6390 as respects orders of its Nuclear Safety Board.117/ As a matter of practice, Congress has generally placed jurisdiction to review actions of administrative agencies in the Courts of Appeals, rather than the U.S. District Courts, except where taking evidence is required.118/ As a matter of law, however, jurisdiction to review federal agency actions is confined to the District Courts unless expressly vested in the Courts of Appeals by statute.119/ Thus, it is necessary for the legislation

---

116/ H.R. 6390 §202.

117/ See 49 App. U.S.C. §1905(d); H.R. 6390 §211.

118/ Kenneth C. Davis, 4 Administrative Law Treatise §23.5 at 134 (2d ed. 1983).

119/ 28 U.S.C. §1331. See also K. Davis, 4 Administrative Law Treatise §23.5 at 134-135 (2d ed. 1983).

to state specifically that Board orders are to be reviewed by the Courts of Appeals if judicial review is to be vested in that forum.

4. Public Access to Information. The legislation should provide for public access to "any communication, document, or other item of information received or transmitted by the Board," consistent with the Atomic Energy Act, section 1905 of title 18 of the United States Code, the Freedom of Information Act, and the Privacy Act. (See discussion Part III of this report.)

5. Submission of Certain Information to the Congress. H.R. 6390 would have required the Board to submit "any budget estimate (or other budget information), any legislative recommendation or comment on legislation, or any testimony prepared for Congressional hearings" to the Congress concurrently with transmission of such document to the Office of Management and Budget or to the President.120/ The Independent Safety Board Act contains a comparable provision for the NTSB.121/ The evident purpose of these provisions is to protect the independence of the Board by preventing any Executive Branch official from modifying the views of the Board on such matters prior to Board submissions thereof to the Congress. Generally,

---

120/ H.R. 6390 §208.

121/ 49 App. U.S.C. §1903(b)(7).

this type of limitation is not viewed with favor by Administrations (regardless of party), particularly where it impacts on the President's responsiblity to formulate and submit budgetary proposals for the government as a whole.

6. Response to Board Recommendations. H.R. 6390 would have required the NRC to submit to the Board a written response to every Board recommendation within ninety days after the NRC receives it, which response should set forth a timetable for implementing each recommendation or the reasons for not adopting such recommendation. In addition, H.R. 6390 would have required the Board to publish notice of the issuance of each such recommendation, and receipt of each NRC response in the Federal Register.122/ The Independent Safety Board Act requires DOT to respond to NTSB recommendations in a similar fashion, and for NTSB to publish notice of its recommendations and receipt of DOT responses in the Federal Register.123/

7. Use of Reports as Evidence. H.R. 6390 would have prohibited the use of "any report or recommendation issued by the Board relating to any nuclear accident or any investigation conducted by the Board" as evidence in any court or "in any action for damages arising from any matter mentioned in such report."124/ The Independent Safety Board Act contains a similar prohibition on the use of NTSB reports in actions for

---

122/ H.R. 6390 §209.

123/ 49 App. U.S.C. §1906.

124/ H.R. 6390 §205(f)(2).

damages.125/ As discussed in Part III, section 5, of this report, inclusion of such a prohibition in legislation establishing a Nuclear Safety Board would facilitate the Board's ability to collect material information about nuclear accidents or events.

8. Annual Reports. H.R. 6390 would have required the Nuclear Safety Board to submit to Congress in July of each year an annual report on its activities, including:

> (1) a statistical and analytical summary of the investigations conducted and reviewed by the Board during the preceding calendar year;
>
> (2) a survey and summary, in such detail as the Board deems advisable, of the recommendations made by the Board to reduce the likelihood of occurrence of events which could significantly affect the health or safety of the public, together with any response to such recommendations made by the [NRC];
>
> (3) a detailed appraisal of the steps undertaken by the [NRC] to investigate and prevent nuclear incidents potentially harmful to the public health and safety;
>
> (4) such recommendations for legislative and administrative actions relating to nuclear safety as the Board considers desirable; and
>
> (5) such other matters as the Board considers appropriate to include in the report. 126/

The Independent Safety Board Act contains a comparable provision requiring the NTSB to submit an annual report to Congress.127/

125/ 49 App. U.S.C. §1903(c).

126/ H.R. 6390 §212.

127/ 49 App. U.S.C. §1904.

9. Authorization of Appropriations. The legislation should authorize sufficient appropriations to carry out the establishment and operations of the Board during its first year or more of existence. The Independent Safety Board Act authorized appropriations for the NTSB's first two fiscal years of operation; and H.R. 6390 would have authorized appropriations for the first two years of its Nuclear Safety Board's operations.128/

10. Sunset Provision. Consideration should be given as to whether the Nuclear Safety Board would have a finite life. If the Board is given only a finite period of existence, an appropriate "sunset" provision should be included in the legislation. H.R. 6390 provided that the Nuclear Safety Board would cease six years after enactment of this Act.129/ The Independent Safety Board Act, on the other hand, contains no sunset provision for the NTSB.

Conforming Amendments

The authors of H.R. 6390 and the House Committee on Interior and Insular Affairs, which reported the measure, identified no provisions of existing law in respect to NRC that would need to be amended in order to establish the Nuclear Safety Board.130/ Our review of the Atomic Energy Act of 1954, the Energy Reorganization Act of 1974, and NRC

128/ 49 U.S.C. §1907; H.R. 6390 §214.

129/ H.R. 6390 §213.

130/ H. Rep. 96-1382, Part II, 96th Cong., 2d Sess. 45-54 (1980).

Authorization Acts confirms this judgment, assuming that the NRC would retain all if its existing authority.

Conforming amendments to the Atomic Energy Act would be required, of course, if the NRC were (for example) to be divested of its authority to conduct investigations under section 161c.131/ Based upon the Conference Report accompanying H.R. 98-360 and its legislative history, however, Congress does not appear to intend to divest NRC of its power to investigate accidents, but only to establish an investigative organization independent of, and supplemental to, the licensing and regulatory activities of the NRC.132/ Indeed, H.R. 6390 contemplated that the Nuclear Safety Board would relie, to some extent, on NRC investigations.133/ Similarly, the NTSB relies on DOT to investigate the facts concerning accidents, which are then analyzed by the NTSB.134/ Moreover, as a practical matter, the NRC could not realistically be expected to fulfill its obligation to protect the public health and safety if divested of its ability to investigate accidents and operating

---

131/ Section 161c. of the Atomic Energy Act, 42 U.S.C. §2201(c) authorizes the NRC to "make such studies and investigations, obtain such information, and hold such meetings or hearings as the Commission may deem necessary or proper to assist it in exercising any authority under this Act, or in the administration or enforcement of this Act, or any regulations or orders issued thereunder."

132/ 130 Cong. Rec. S7931-S7933 (June 21, 1984).

133/ H.R. 6390 §204(1).

134/ 49 App. U.S.C. §1903(a)(1).

incidents.

Even if the NRC retains all of its current authority, however, it may be desirable to terminate or restrict certain NRC programs which would be duplicated by the Nuclear Safety Board. Congress may choose not to fund both a monitoring center within the Nuclear Safety Board (see Part III, section 17) and the NRC's "Nuclear Data Link" program, for example, or both the AEOD and an operating data analysis program within the Board (see Part III, section 12). The continuation or curtailment of duplicative NRC programs could best be addressed in NRC authorization legislation, however, rather than through changes to the NRC's substantive authority in the Atomic Energy Act. In addition, the NRC and Nuclear Safety Board could avoid duplication of efforts through memoranda of agreement, such as those executed by DOT and NTSB.

APPENDIX A

The Independent Safety Board Act of 1974,

as amended and codified at 49 U.S.C. §§1901-1907

CHAPTER 28—NATIONAL TRANSPORTATION SAFETY BOARD

§ 1901. Congressional findings

The Congress finds and declares:

(1) The National Transportation Safety Board was established by statute in 1966 (Public Law 89-670; 80 Stat. 935) as an independent Government agency, located within the Department of Transportation, to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations.

(2) Proper conduct of the responsibilities assigned to this Board requires vigorous investigation of accidents involving transportation modes regulated by other agencies of Government; demands continual review, appraisal, and assessment of the operating practices and regulations of all such agencies; and calls for the making of conclusions and recommendations that may be critical of or adverse to any such agency or its officials. No Federal agency can properly perform such functions unless it is totally separate and independent from any other department, bureau, commission, or agency of the United States.

(Pub. L. 93-633, title III, § 302, Jan. 3, 1975, 88 Stat. 2166.)

§ 1902. National Transportation Safety Board

(a) Establishment

The National Transportation Safety Board (hereafter in this chapter referred to as the "Board"), previously established within the Department of Transportation, shall be an independent agency of the United States, in accordance with this section, on and after April 1, 1975.

(b) Organization

(1) The Board shall consist of five members, including a Chairman. Members of the Board shall be appointed by the President, by and with the advice and consent of the Senate. No more than three members of the Board shall be of the same political party. At any given time, no less than three members of the Board shall be individuals who have been appointed on the basis of technical qualification, professional standing, and demonstrated knowledge in the fields of accident reconstruction, safety engineering, human factors, transportation safety, or transportation regulation.

(2) The terms of office of members of the Board shall be 5 years, except as otherwise provided in this paragraph. Any individual appointed to fill a vacancy occurring on the Board prior to the expiration of the term of office for which his predecessor was appointed shall be appointed for the remainder of that term. Upon the expiration of his term of office, a member shall continue to serve until his successor is appointed and shall have qualified. Individuals serving as members of the National Transportation Safety Board on January 3, 1975, shall continue to serve as members of the Board until the expiration of their then current term of office. Any member of the Board may be removed by the President for inefficiency, neglect of duty, or malfeasance in office.

(3) On or before January 1, 1976 (and thereafter as required), the President shall—

(A) designate, by and with the advice and consent of the Senate, an individual to serve as the Chairman of the Board (hereafter in this chapter referred to as the "Chairman"); and

(B) an individual to serve as Vice Chairman.

The Chairman and Vice Chairman each shall serve for a term of 2 years. The Chairman shall be the chief executive officer of the Board and shall exercise the executive and administrative functions of the Board with respect to the appointment and supervision of personnel employed by the Board; the distribution of business among such personnel and among any administrative units of the Board; and the use and expenditure of funds. The Vice Chairman shall act as Chairman in the event of the absence or incapacity of the Chairman or in case of a vacancy in the office of Chairman. The Chairman or Acting Chairman shall be governed by the general policies established by the Board, including any decisions, findings, determinations, rules, regulations, and formal resolutions.

(4) Three members of the Board shall constitute a quorum for the transaction of any function of the Board.

(5) The Board shall establish and maintain distinct and appropriately staffed bureaus, divisions, or offices to investigate and report on accidents involving each of the following modes of transportation: (A) aviation; (B) highway and motor vehicle; (C) railroad and tracked vehicle; and (D) pipeline. The Board shall, in addition, establish and maintain any other such office as is needed, including an office to investigate and report on the safe transportation of hazardous materials.

(c) General

(1) The General Services Administration shall furnish the Board with such offices, equipment, supplies, and services as it is authorized to furnish to any other agency or instrumentality of the United States.

(2) The Board shall have a seal which shall be judicially recognized.

(3) Subject to the civil service and classification laws, the Board is authorized to select, appoint, employ, and fix the compensation of such officers and employees, including investigators, attorneys, and administrative law judges, as shall be necessary to carry out its powers and duties under this chapter.

(Pub. L. 93-633, title III, § 303, Jan. 3, 1975, 88 Stat. 2167; Pub. L. 97-309, § 1, Oct. 14, 1982, 96 Stat. 1453.)

§ 1903. General provisions

(a) Duties of Board

The Board shall—

(1) investigate or cause to be investigated (in such detail as it shall prescribe), and determine the facts, conditions, and circumstances and the cause or probable cause or causes of any—

(A) aircraft accident which is within the scope of the functions, powers, and duties transferred from the Civil Aeronautics Board under section 1655(d) of this Appendix pursuant to title VII of the Federal Aviation Act of 1958, as amended [49 App. U.S.C. 1441 et seq.];

(B) highway accident, including any railroad grade crossing accident, that it selects in cooperation with the States;

(C) railroad accident in which there is a fatality, substantial property damage, or which involves a passenger train;

(D) pipeline accident in which there is a fatality or substantial property damage;

(E) major marine casualty, except one involving only public vessels, occurring on the navigable waters or territorial seas of the United States, or involving a vessel of the United States, in accordance with regulations to be prescribed jointly by the Board and the Secretary of the department in which the Coast Guard is operating. Nothing in this subparagraph shall be construed to eliminate or diminish any responsibility under any other Federal statute of the Secretary of the Department in which the Coast Guard is operating: *Provided*, That any marine accident involving a public vessel and any other vessel shall be investigated and the facts, conditions, and circumstances, and the cause or probable cause determined and made available to the public by either the Board or the Secretary of the Department in which the Coast Guard is operating; and

(F) other accident which occurs in connection with the transportation of people or property which, in the judgment of the Board, is catastrophic, involves problems of a recurring character, or would otherwise carry out the policy of this chapter.

Any investigation of an accident conducted by the Board under this paragraph (other than subparagraph (E)) shall have priority over all other investigations of such accident conducted by other Federal agencies. The Board shall provide for the appropriate participation by other Federal agencies in any such investigation, except that such agencies may not participate in the Board's determination of the probable cause of the accident. Nothing in this section impairs the authority of other Federal agencies to conduct investigations of an accident under applicable provisions of law or to obtain information directly from parties involved in, and witnesses to, the transportation accident. The Board and other Federal agencies shall assure that appropriate information obtained or developed in the course of their investigations is exchanged in a timely manner. The Board may request the Secretary of Transportation (hereafter in this chapter referred to as the "Secretary") to make investigations with regard to such accidents and to report to the Board the facts, conditions, and circumstances thereof (except in accidents where misfeasance or nonfeasance by the Federal Government is alleged), and the Secretary or his designees are authorized to make such investigations. Thereafter, the Board, utilizing such reports, shall make its determination of cause or probable cause under this paragraph;

(2) report in writing on the facts, conditions, and circumstances of each accident investigated pursuant to paragraph (1) of this subsection and cause such reports to be made available to the public at reasonable cost and to cause notice of the issuance and availability of such reports to be published in the Federal Register;

(3) issue periodic reports to the Congress, Federal, State, and local agencies concerned with transportation safety, and other interested persons recommending and advocating meaningful responses to reduce the likelihood of recurrence of transportation accidents similar to those investigated by the Board and proposing corrective steps to make the transportation of persons as safe and free from risk of injury as is possible, including steps to minimize human injuries from transportation accidents;

(4) initiate and conduct special studies and special investigations on matters pertaining to safety in transportation including human injury avoidance;

(5) assess and reassess techniques and methods of accident investigation and prepare and publish from time to time recommended procedures for accident investigations;

(6) establish by regulation requirements binding on persons reporting accidents and aviation incidents subject to the Board's investigatory jurisdiction under this subsection.

(7) evaluate, assess the effectiveness, and publish the findings of the Board with respect to the transportation safety conscious-

ness and efficacy in preventing accidents of other Government agencies;

(8) evaluate the adequacy of safeguards and procedures concerning the transportation of hazardous materials and the performance of other Government agencies charged with assuring the safe transportation of such materials; and

(9) review on appeal (A) the suspension, amendment, modification, revocation, or denial of any operating certificate or license issued by the Secretary of Transportation under sections 1422, 1429, or 1431(c)[1] of this Appendix; and (B) the decisions of the Commandant of the Coast Guard, on appeals from the orders of any administrative law judge revoking, suspending, or denying a license, certificate, document, or register in proceedings under section 239 of title 46, sections 239a and 239b of title 46; or section 216b of title 46.

(b) Powers of Board

(1) The Board, or upon the authority of the Board, any member thereof, any administrative law judge employed by or assigned to the Board, or any officer or employee duly designated by the Chairman, may, for the purpose of carrying out this chapter, hold such hearings, sit and act at such times and places, administer such oaths, and require by subpoena or otherwise the attendance and testimony of such witnesses and the production of such evidence as the Board or such officer or employee deems advisable. Subpoenas shall be issued under the signature of the Chairman, or his delegate, and may be served by any person designated by the Chairman. Witnesses summoned to appear before the Board shall be paid the same fees and mileage that are paid witnesses in the courts of the United States. Such attendance of witnesses and production of evidence may be required from any place in the United States to any designated place of such hearing in the United States.

(2) Any employee of the Board, upon presenting appropriate credentials and a written notice of inspection authority, is authorized to enter any property wherein a transportation accident has occurred or wreckage from any such accident is located and do all things therein necessary for a proper investigation, including examination or testing of any vehicle, rolling stock, track, or pipeline component or any part of any such item when such examination or testing is determined to be required for purposes of such investigation. Any examination or testing shall be conducted in such manner so as not to interfere with or obstruct unnecessarily the transportation services provided by the owner or operator of such vehicle, rolling stock, track, or pipeline component, and shall be conducted in such a manner so as to preserve, to the maximum extent feasible, any evidence relating to the transportation accidents, consistent with the needs of the investigation and with the cooperation of such owner or operator. The employee may inspect, at reasonable times, records, files, papers, processes, controls, and facilities relevant to the investigation of such

accident. Each inspection, examination, or test shall be commenced and completed with reasonable promptness and the results of such inspection, examination, or test made available.

(3) In case of contumacy or refusal to obey a subpoena, an order, or an inspection notice of the Board, or of any duly designated employee thereof, by any person who resides, is found, or transacts business within the jurisdiction of any district court of the United States, such district court shall, upon the request of the Board, have jurisdiction to issue to such person an order requiring such person to comply forthwith. Failure to obey such an order is punishable by such court as a contempt of court.

(4) The Board is authorized to enter into without regard to section 5 of title 41, such contracts, leases, cooperative agreements, or other transactions as may be necessary in the conduct of the functions and the duties of the Board under this chapter, with any government entity or any person.

(5) The Board is authorized to obtain, and shall be furnished, with or without reimbursement, a copy of the report of the autopsy performed by State or local officials on any person who dies as a result of having been involved in a transportation accident within the jurisdiction of the Board and, if necessary, the Board may order the autopsy or seek other tests of such persons as may be necessary to the investigation of the accident: *Provided*, That to the extent consistent with the need of the accident investigation, provisions of local law protecting religious beliefs with respect to autopsies shall be observed.

(6) The Board is authorized to (A) use, on a reimbursable basis or otherwise, when appropriate, available services, equipment, personnel, and facilities of the Department of Transportation and of other civilian or military agencies and instrumentalities of the Federal Government; (B) confer with employees and use available services, records, and facilities of State, municipal, or local governments and agencies; (C) employ experts and consultants in accordance with section 3109 of title 5; (D) appoint one or more advisory committees composed of qualified private citizens or officials of Federal, State, or local governments as it deems necessary or appropriate, in accordance with the Federal Advisory Committee Act; (E) accept voluntary and uncompensated services notwithstanding any other provision of law; (F) accept gifts or donations of money or property (real, personal, mixed, tangible, or intangible); and (G) enter into contracts with public or private nonprofit entities for the conduct of studies related to any of its functions.

(7) Whenever the Board submits or transmits any budget estimate, budget request, supplemental budget estimate, or other budget information, legislative recommendation, prepared testimony for congressional hearings, or comment on legislation to the President or to the Office of Management and Budget, it shall concurrently transmit a copy thereof to the Congress. No officer or agency of the United States shall have any authority to require the Board to submit its budget requests or estimates, legis-

lative recommendations, prepared testimony for congressional hearings, or comments on legislation to any officer or agency of the United States for approval, comments, or review, prior to the submission of such recommendations, testimony, or comments to the Congress.

(8) The Board is empowered to designate representatives to serve or assist on such committees as the Chairman determines to be necessary or appropriate to maintain effective liaison with other Federal agencies, and with State and local government agencies, and with independent standard-setting bodies carrying out programs and activities related to transportation safety.

(9) The Board, or an employee of the Board duly designated by the Chairman, may conduct an inquiry to secure data with respect to any matter pertinent to transportation safety, upon publication of notice of such inquiry in the Federal Register; and may require, by special or general orders, Federal, State, and local government agencies and persons engaged in the transportation of people or property in commerce to submit written reports and answers to such requests and questions as are propounded with respect to any matter pertinent to any function of the Board. Such reports and answers shall be submitted to the Board or to such employee within such reasonable period of time and in such form as the Board may determine. Copies thereof shall be made available for inspection by the public.

(10) Establish such rules and regulations as may be necessary to the exercise of its functions.

(c) Use of reports as evidence

No part of any report of the Board, relating to any accident or the investigation thereof, shall be admitted as evidence or used in any suit or action for damages growing out of any matter mentioned in such report or reports.

(d) Judicial review

Any order, affirmative or negative, issued by the Board under this chapter shall be subject to review by the appropriate court of appeals of the United States or the United States Court of Appeals for the District of Columbia, upon petition filed within 60 days after the entry of such order, by any person disclosing a substantial interest in such order. Such review shall be conducted in accordance with the provisions of chapter 7 of title 5.

(Pub. L. 93-633, title III, § 304, Jan. 3, 1975, 88 Stat. 2168; Pub. L. 97-74, §§ 3-5, Nov. 3, 1981, 95 Stat. 1065.)

§ 1904. Annual report

The Board shall report to the Congress on July 1 of each year. Such report shall include, but need not be limited to—

(1) a statistical and analytical summary of the transportation accident investigations conducted and reviewed by the Board during the preceding calendar year;

(2) a survey and summary, in such detail as the Board deems advisable, of the recommendations made by the Board to reduce the likelihood of recurrence of such accidents together with the observed response to each such recommendation;

(3) an appraisal in detail of the accident investigation and accident prevention activities of other government agencies charged by Federal or State law with responsibility in this field; and

(4) a biennial appraisal and evaluation and review, and recommendations for legislative and administrative action and change, with respect to transportation safety.

(Pub. L. 93-633, title III, § 305, Jan. 3, 1975, 88 Stat. 2171.)

§ 1906. Public access to information

(a) General

Copies of any communication, document, investigation, or other report, or information received or sent by the Board, or any member or employee of the Board, shall be made available to the public upon identifiable request, and at reasonable cost, unless such information may not be publicly released pursuant to subsection (b) or (c) of this section. Nothing contained in this section shall be deemed to require the release of any information described by subsection (b) of section 552 of title 5, or which is otherwise protected by law from disclosure to the public.

(b) Exception

The Board shall not disclose information obtained under this chapter which concerns or relates to a trade secret referred to in section 1905 of title 18, except that such information may be disclosed in a manner designed to preserve confidentiality—

(1) upon request, to other Federal Government departments and agencies for official use;

(2) upon request, to any committee of Congress having jurisdiction over the subject matter to which the information relates;

(3) in any judicial proceeding under a court order formulated to preserve the confidentiality of such information without impairing the proceedings; and

(4) to the public in order to protect health and safety, after notice to any interested person to whom the information pertains and an opportunity for such person to comment in writing, or orally in closed session, on such proposed disclosure (if the delay resulting from such notice and opportunity for comment would not be detrimental to health and safety).

(c) Cockpit voice recorder

Notwithstanding any other provision of law, the Board shall withhold from public disclosure cockpit voice recorder recordings and transcriptions, in whole or in part, of oral communications by and between flight crew members and ground stations, that are associated with accidents or incidents investigated by the Board: *Provided*, That portions of a transcription of such oral communications which the Board deems relevant and pertinent to the accident or incident shall be made available to the public by the Board at the time of the Board's public hearing, and in no event later than 60 days following the accident or incidents: *And provided further*, That nothing in this section shall restrict the Board at any time from referring to cockpit voice recorder information in making safety recommendations.

(Pub. L. 93-633, title III, § 306, Jan. 3, 1975, 88 Stat. 2172; Pub. L. 97-309, § 2, Oct. 14, 1982, 96 Stat. 1453.)

§ 1906. Response to Board recommendations

(a) Secretary's duty to respond; contents of response; publication; public availability of copies

Whenever the Board submits a recommendation regarding transportation safety to the Secretary, he shall respond to each such recommendation formally and in writing not later than 90 days after receipt thereof. The response to the Board by the Secretary shall indicate his intention to—

(1) initiate and conduct procedures for adopting such recommendations in full, pursuant to a proposed timetable, a copy of which shall be included;

(2) initiate and conduct procedures for adopting such recommendation in part, pursuant to a proposed timetable, a copy of which shall be included. Such response shall set forth in detail the reasons for the refusal to proceed as to the remainder of such recommendation; or

(3) refuse to initiate or conduct procedures for adopting such recommendation. Such response shall set forth in detail the reasons for such refusal.

The Board shall cause notice of the issuance of each such recommendation and of each receipt of a response thereto to be published in the Federal Register, and shall make copies thereof available to the public at reasonable cost.

(b) Annual report to Congress

The Secretary shall submit a report to the Congress on January 1 of each year setting forth all the Board's recommendations to the Secretary during the preceding year regarding transportation safety and a copy of the Secretary's response to each such recommendation.

(Pub. L. 93-633, title III, § 307, Jan. 3, 1975, 88 Stat. 2172; Pub. L. 97-74, § 6, Nov. 3, 1981, 95 Stat. 1066.)

§ 1907. Authorization of appropriations

There are authorized to be appropriated for the purposes of this Act not to exceed $12,000,000 for the fiscal year ending June 30, 1975; and $12,000,000 for the fiscal year ending June 30, 1976, such sums to remain available until expended. There are authorized to be appropriated for the purpose of this Act not to exceed $3,800,000 for the transition quarter ending September 30, 1976, $15,200,000 for the fiscal year ending September 30, 1977, and $16,400,000 for the fiscal year ending September 30, 1978, such sums to remain available until expended. There are authorized to be appropriated for the purposes of this Act not to exceed $16,420,000 for the fiscal year ending September 30, 1979, and $17,650,000 for the fiscal year ending September 30, 1980, such sums to remain available until expended. There are authorized to be appropriated for the purposes of this Act not to exceed $18,540,000 for the fiscal year ending September 30, 1981, $19,925,000 for the fiscal year ending September 30, 1982, and $22,100,000 for the fiscal year ending September 30, 1983, such sums to remain available until expended.

(Pub. L. 93-633, title III, § 309, Jan. 3, 1975, 88 Stat. 2173; Pub. L. 94-481, Oct. 11, 1976, 90 Stat. 2080; Pub. L. 95-363, § 2, Sept. 11, 1978, 92 Stat. 597; Pub. L. 97-74, § 2, Nov. 3, 1981, 95 Stat. 1065.)

APPENDIX B

Title II of H.R. 6390, 96th Cong., 2d Sess.,

as reported by the House Committee

on Interior and Insular Affairs

TITLE II—NUCLEAR SAFETY BOARD

FINDINGS AND PURPOSES

SEC. 201. (a) FINDINGS.—The Congress finds that—

(1) there is a great need for—

(A) vigorous investigation of events at facilities, or involving materials, licensed or otherwise regulated by the Nuclear Regulatory Commission; and

(B) continual review and assessment of licensing and other regulatory practices of the Nuclear Regulatory Commission, which assessment may result in conclusions critical of the Nuclear Regulatory Commission or its officials; and

(2) no Federal agency can properly perform such functions unless it is independent of all other agencies and instrumentalities of the United States.

(b) PURPOSE.—It is the purpose of this title to establish a Nuclear Safety Board as an independent establishment in the executive branch of the United States, which shall promote nuclear safety by conducting independent investigations of events at facilities, or involving materials, licensed or otherwise regulated by the Nuclear Regulatory Commission and by recommending to the Nuclear Regulatory Commission improvements in licensing and related regulatory practices.

NUCLEAR SAFETY BOARD

SEC. 202. (a) ESTABLISHMENT.—There is established the Nuclear Safety Board (hereinafter in this title referred to as the "Board"), which shall be an independent establishment in the executive branch of the United States. The Board shall have a seal which shall be judicially recognized.

(b) APPOINTMENT.—(1) The Board shall be composed of 3 members appointed by the President, by and with the advice and consent of the Senate, from among persons who are not officers or employees of the Federal Government. No more than 2 members of the Board shall be of the same political party. The President shall submit to the Senate not later than 90 days after the date of the enactment of this Act his recommendations for appointment to the Board.

(2) Any vacancy in the membership of the Board shall be filled in the same manner in which the original appointment was made.

(c) CHAIRMAN AND VICE CHAIRMAN.—(1) The Chairman and Vice Chairman of the Board shall be designated by the President. The terms of office of the Chairman and Vice Chairman shall be 2 years and shall run concurrently. The Chairman and Vice Chairman may be reappointed to such offices.

(2) The Chairman shall be the chief executive officer of the Board and shall, subject to such policies as the Board

may establish, exercise the functions of the Board with respect to—

(A) the appointment and supervision of personnel employed by the Board;

(B) the organization of any administrative units established by the Board; and

(C) the use and expenditure of funds.

The Chairman may delegate any of his functions under this subparagraph to any other member or to any appropriate agent of the Board.

(3) The Vice Chairman shall act as Chairman in the event of the absence or incapacity of the Chairman or in case of a vacancy in the office of Chairman.

(d) TERMS.—(1) Except as provided under paragraph (2), the members of the Board shall serve for terms of 6 years. Members of the Board may be reappointed.

(2) Of the members first appointed—

(A) one shall be appointed for a term of 2 years;

(B) one shall be appointed for a term of 4 years; and

(C) one shall be appointed for a term of 6 years;

as designated by the President at the time of appointment.

(3) Any member appointed to fill a vacancy occurring before the expiration of the term of office for which his predecessor was appointed shall be appointed only for the remain-

der of such term. A member may serve after the expiration of his term until his successor has taken office.

(4) Any member of the Board may be removed by the President for inefficiency, neglect of duty, or malfeasance in office.

(e) QUORUM.—Two members of the Board shall constitute a quorum, but a lesser number may hold hearings.

(f) BASIC PAY.—(1) Members of the Board other than the Chairman shall each be paid at a rate equal to the rate of basic pay payable for level IV of the Executive Schedule. The Chairman shall be paid at a rate equal to the rate of basic pay payable for level III of the Executive Schedule.

(2) While away from their homes or regular places of business in the performance of services for the Board, members of the Board shall be allowed travel expenses, including per diem in lieu of subsistence, in the same manner as persons employed intermittently in the Government service are allowed expenses under section 5703 of title 5, United States Code.

STAFF AND SUPPORT SERVICES

SEC. 203. (a) STAFF.—(1) Subject to such rules as may be prescribed by the Board, the Chairman may appoint and fix the pay of such officers and employees (including investigators and attorneys) as the Chairman considers necessary to carry out the powers and duties of the Board. Ap-

pointments shall be made under this paragraph in such manner that not more than the equivalent of 50 full-time officers and employees are employed by the Board at any time.

(2) The staff of the Board shall be appointed subject to the provisions of title 5, United States Code, governing appointments in the competitive service and shall be paid in accordance with the provisions of chapter 51 and subchapter III of chapter 53 of such title, relating to classification and General Schedule pay rates.

(b) EXPERTS AND CONSULTANTS.—Subject to such rules as may be prescribed by the Board, the Chairman may procure temporary and intermittent services under section 3109(b) of title 5, United States Code, but at rates for individuals not to exceed the daily equivalent of the maximum annual rate of basic pay payable for grade GS-18 of the General Schedule. The amount of consultant services which may be obtained by the Board under this subsection shall not exceed, during any fiscal year period, the amount of services which would be obtained if the Board procured on a full-time basis the services of 12 consultants.

(c) STAFF AND SUPPORT SERVICES OF FEDERAL AGENCIES.—(1) Upon request of the Board, the Nuclear Regulatory Commission and the head (or governing authority) of any other Federal agency or instrumentality may—

(A) detail to the Board, on a reimbursable basis such personnel as may be desirable to assist the Board in carrying out its duties; and

(B) make available to the Board, on a reimbursable basis, such facilities, equipment, or other administrative support services as may be desirable to assist the Board in carrying out its duties.

(2) The General Services Administration shall provide to the Board on a reimbursable basis such administrative support services as the Board may request.

(d) SUPPORT SERVICES OF STATE OR LOCAL AGENCIES.—The Board may confer with employees of State or local government agencies and may use, on a reimbursable basis, such services, records, and facilities as such agencies may make available to the Board.

(e) MAILS.—The Board may use the United States mails in the same manner and under the same conditions as other departments and agencies of the United States.

(f) GIFTS AND VOLUNTARY SERVICES.—Notwithstanding any other law, the Commission may accept—

(1) voluntary, uncompensated services; and

(2) gifts or donations of money or other property of any type.

DUTIES OF THE BOARD

SEC. 204. The Board shall have the following duties and authorities:

(1) The Board shall investigate those events at any facility, or involving any materials, licensed or otherwise regulated by the Nuclear Regulatory Commission, which the board determines to be significant because of possible effects on the health or safety of the public or because such events could be the precursors of events affecting the health or safety of the public. The Board may request the Nuclear Regulatory Commission to make investigations with regard to such events and to report its findings to the Board. Whenever the Nuclear Regulatory Commission makes such an investigation, the Board shall analyze the findings of the Commission for purpose of making its own conclusions and recommendations. The purpose of any investigation under this paragraph shall be—

(A) to ascertain information concerning the circumstances of the event involved, and its implications for the public health and safety; and

(B) to determine whether such event is part of a pattern of similar events at facilities, or involving any materials, licensed or otherwise regulated by the Nuclear Regulatory Commission *which could significantly affect the public health or safety or which could be the precursor of events which could significantly affect the public health or safety.*

(2) The Board shall systematically analyze operational data from any facility, or involving any materials, licensed or otherwise regulated by the Nuclear Regulatory Commission to determine whether there exist certain patterns of events that indicate safety problems.

(3) The Board may conduct special studies pertaining to the nuclear safety at any facility, or involving any materials, licensed or otherwise regulated by the Nuclear Regulatory Commission.

(4) The Board may evaluate suggestions received from the scientific and industrial communities, and from other knowledgeable sources, on specific measures to improve safety at facilities, or involving materials, licensed or otherwise regulated by the Nuclear Regulatory Commission.

(5) The Board shall recommend to the Nuclear Regulatory Commission those specific measures that should be adopted to minimize the likelihood that events will occur at any facility, or involving materials, licensed or otherwise regulated by the Nuclear

Regulatory Commission which could significantly affect the public health or safety.

(6) The Board shall establish reporting requirements binding upon—

(A) persons who operate, design, supply, maintain, or are otherwise involved with the operation or construction of, facilities licensed or otherwise regulated by the Nuclear Regulatory Commission;

(B) persons who process, store, transport, use, or possess materials licensed or otherwise regulated by the Nuclear Regulatory Commission; and

(C) persons who export nuclear equipment pursuant to any license or permit issued by the Nuclear Regulatory Commission.

The information which the Board may require to be reported under this paragraph may include any materials designated as classified material pursuant to the Atomic Energy Act of 1954, or any materials designated as safeguards information and protected from disclosure under section 147 of the Atomic Energy Act of 1954.

(7) The Board shall issue periodic reports which shall be made available to the Congress, and to Feder-

al, State, and local government agencies concerned with safety at facilities, or involving materials, licensed or otherwise regulated by the Nuclear Regulatory Commission. Upon request, such reports shall be made available to other interested persons. Such reports shall contain recommendations of specific measures to reduce the likelihood of occurrence of nuclear events similar to those investigated by the Board and of corrective steps to make any facilities investigated by the Board as safe as is possible.

(8) The Board shall establish a monitoring center for the purpose of receiving reactor data on an instantaneous or otherwise timely basis from each nuclear powerplant licensed under the Atomic Energy Act of 1954. The monitoring center shall be staffed by officers or employees of the Board who shall be responsible for (A) analysing the data so received in order to determine whether any potentially dangerous situation exists at any of the facilities transmitting the data, and (B) making appropriate recommendations to the operators of nuclear powerplants when it is determined that such a situation does exist.

SPECIFIC POWERS OF THE BOARD

SEC. 205. (a) HEARINGS.—(1) The Board may, for the purpose of carrying out this title, hold such hearings, sit *and act at such times and places, take such testimony, and receive such evidence, as the Board considers appropriate. The Board may administer oaths or affirmations to witnesses appearing before it.*

(2) Witnesses summoned to appear before the Board shall be paid the same fees and mileage that are paid witnesses in the courts of the United States.

(b) SUBPENA POWER.—The Board may issue subpenas (under the signature of the Chairman or his delegate) requiring the attendance and testimony of witnesses and the production of any evidence that relates to any matter under investigation by the Board. The attendance of witnesses and production of evidence may be required from any place in the United States to any designated place of hearing in the United States. The subpenas of the Commission shall be served in the manner provided for subpenas issued by a United States district court under the Federal Rules of Civil Procedures for the United States district courts.

(c) INSPECTION AUTHORITY.—Any employee of the Board, upon presenting appropriate credentials and a written notice of inspection authority, may enter any facility licensed or otherwise regulated by the Nuclear Regulatory Commission, and any property containing materials licensed or otherwise regulated by the Nuclear Regulatory Commission, in which an event has occurred which, in the determination of

the Board, has significant implications for the public health or safety, and do all things appropriate for a proper investigation. The employee may inspect, at reasonable times, records, files, papers, processes, controls, and facilities relevant to the investigation of such accident. Each inspection shall be commenced and completed with reasonable promptness and the results of such inspection made available to the public, subject to the limitation contained in section 207(a)(2).

(d) AUTOPSY AND OTHER MEDICAL INFORMATION.—The Board shall be furnished, upon request, with or without reimbursement, a copy of the report of any autopsy performed by State or local officials on any person who dies as a result of having been involved in any nuclear accident. The Board may order an autopsy (if an autopsy has not been made) or seek such other tests of survivors involved in such accidents (subject to their approval) as may be necessary to the investigation of the accident. To the maximum extent consistent with the need of the investigation, provisions of local law protecting religious beliefs with respect to autopsies shall be observed.

(e) ENFORCEMENT AUTHORITY.—(1) If any person who is issued a subpena under subsection (c), required to submit to an inspection under subsection (d), or issued any other order by the Board under this title, is guilty of contumacy, refuses to obey such subpena or other order, or refuses

to submit to such inspection, any court of the United States within the judicial district within which the hearing or inspection involved is conducted or within the judicial district within which such person is found or resides or transacts business may (upon application by the Board) order such person to comply with the subpena, inspection notice, or other order, as the case may be. Any failure to obey such order of the court may be punished by the court as a contempt thereof.

(2) All process of any court to which application may be made under this subsection shall be served in the judicial district in which the person required to be served resides or may be found.

(f) IMMUNITY; USE OF REPORTS AS EVIDENCE.—(1) For purposes of sections 6002 and 6004 of title 18, United States Code, the Commission shall be considered to be an agency of the United States.

(2) No part of any report or recommendation issued by the Board relating to any nuclear accident or any investigation conducted by the Board shall be admitted as evidence in any court, or otherwise used in any action for damages arising from any matter mentioned in such report.

GENERAL ADMINISTRATIVE POWERS OF THE BOARD

SEC. 206. (a) OBTAINING OFFICIAL DATA.—(1) Subject to section 552a of title 5, United States Code, the Board may secure directly from any agency or instrumentality of *the United States such information as may be necessary to enable it to carry out this title. Upon request of the Chairman of the Board, the head of such department or instrumentality shall furnish such information to the Board. The information which the Board may secure under this paragraph may include any material designated as classified material pursuant to the Atomic Energy Act of 1954, or any materials designated as safeguard information and otherwise protected from disclosure under section 147 of the Atomic Energy Act of 1954.*

(2) The Board may conduct an inquiry to secure data with respect to any matter pertinent to nuclear safety, upon publication of notice of such inquiry in the Federal Register. The Board may by order of the Board require Federal, State, or local governmental agencies, or any person engaged in interstate commerce, to submit written responses to any requests for information made by the Board with regard to matters within the jurisdiction of the Board. Such responses shall be submitted to the Board in such form, and within such reasonable period of time, as the Board may require. Copies of such responses shall, subject to the limitations contained in section 207(a)(2), be made available for inspection by the public.

(b) DELEGATION.—Any member or agent of the Board (including officers, employees, and administrative law judges

assigned to the Board) may, if so authorized by the Board, take any action which the Board may take under this title.

(c) CONTRACTING AUTHORITY.—Without regard to section 3709 of the Revised Statutes, the Board may enter into such contracts, leases, cooperative agreements, or other transactions as may be necessary in the conduct of the functions of the Board, including contracts with public or private nonprofit entities for the conduct of studies related to its functions.

(d) LIAISON.—The Board may designate representatives to serve or assist on such committees as the Chairman determines to be appropriate to maintain effective liaison with other Federal agencies, with State and local government agencies, and with independent standard-setting bodies carrying out programs and activities related to safety at facilities regulated by the Nuclear Regulatory Commission.

(e) ADVISORY COMMITTEES.—In accordance with the Federal Advisory Committee Act (5 U.S.C. App. I), the Board may appoint one or more advisory committees composed of qualified citizens (including officers or employees of Federal, State, or local governments) as the Board considers appropriate to assist the Board in conducting its functions.

(f) RULES AND REGULATIONS.—The Board may establish such rules and regulations as may be necessary to the exercise of its functions. Nothing contained in this title shall *be construed to authorize the Board to promulgate rules or regulations other than those related to (1) the reporting functions of the Board as described under sections 204 and 205, or (2) personnel or other internal administrative affairs of the Board.*

PUBLIC ACCESS TO INFORMATION

SEC. 207. (a) IN GENERAL.—(1) Copies of any communication, document, or other item of information received or transmitted by the Board (or by any member or employee of the Board upon authority of the Board) shall be made available to the public upon request, and at a reasonable cost, unless such information may not be publicly released pursuant to paragraph (2) of this subsection.

(2) The Board shall not disclose information obtained under this title which concerns or relates to any trade secret referred to in section 1905 of title 18, United States Code, except as permitted under subsection (b) of this section. Any information obtained by the Board which is considered to be safeguards information (as described under section 147 of the Atomic Energy Act of 1954) may not be disclosed by the Board unless disclosure of such information would be permitted by the Nuclear Regulatory Commission pursuant to such section, and no material obtained by the Board which is designated as classified material pursuant to such Act may be disclosed. Nothing contained in this section shall be consid-

ered to require the release of any information described by section 552(b) of title 5, United States Code, or which is otherwise protected by law from disclosure to the public.

(b) EXCEPTIONS.—The Board may disclose information obtained under this title which concerns or relates to any trade secret referred to in section 1905 of title 18, United States Code, only in a manner designed to preserve confidentiality and only—

(1) upon request, to other Federal agencies or instrumentalities for official use;

(2) upon request, to any committee of the Congress having jurisdiction over the subject matter to which the information relates;

(3) in any judicial proceeding under a court order formulated to preserve the confidentiality of such information without impairing the proceedings; and

(4) to the public in order to protect health and safety, after notice to any interested person to whom the information pertains and an opportunity for such person to comment in writing, or orally in closed session, on such proposed disclosure (if the delay resulting from such notice and opportunity for comment would not be detrimental to health and safety).

SUBMISSION OF CERTAIN INFORMATION TO THE CONGRESS

SEC. 208. Whenever the Board transmits to the Office of Management and Budget or to the President any budget estimate (or other budget information), any legislative recommendation or comment on legislation, or any testimony prepared for Congressional hearings, the Board shall concurrently transmit a copy thereof to the Congress. No officer or employee of the United States shall have any authority to require the Board to submit the items referred to in the preceding sentence to any officer or employee of the United States for approval or review before submission of such items to the Congress in accordance with this section.

RESPONSE TO BOARD RECOMMENDATIONS

SEC. 209. (a) RESPONSES REQUIRED.—Whenever the Board svbmits a recommendation regarding nuclear safety to the Nuclear Regulatory Commission, such Commission shall submit to the Board a written response to each such recommendation not later than 90 days after receipt thereof. The response made by the Nuclear Regulatory Commission shall indicate whether such Commission intends to conduct procedures for adopting such recommendation in whole or in part, and the timetable proposed by the Commission for conducting such procedures. In the case of any recommendation which such Commission does not intend to *adopt in its entirety, the Commission shall explain in detail the reasons for its determination not to adopt all, or part, of the recommendation (as the case may be).*

(b) PUBLIC DISCLOSURE.—The Board shall cause notice of the issuance of each such recommendation and of each receipt of a response thereto to be published in the Federal Register, and shall make copies thereof available to the public at reasonable cost. Such notice shall include the contents of each such recommendation or response, as the case may be.

CIVIL PENALTIES

SEC. 210. (a) AMOUNT.—Any person who violates any reporting requirement established under section 204(6) shall be liable to the United States for a civil penalty in an amount not to exceed $5,000 for each such violation. Each day such a violation continues shall, for purposes of this section, constitute a separate violation of such section.

(b) HEARING.—A civil penalty for a violation of section 204(6) shall be assessed by the Board by an order made on the record after opportunity for a hearing in accordance with section 554 of title 5, United States Code. Before issuing such an order, the Board shall give written notice to the person to be assessed a civil penalty under such order of the Board's proposal to issue such order and shall provide such person an opportunity to request, within 15 days of the date

the notice is received by such person, such a hearing on the order.

(c) MODIFICATION.—The Board may compromise, modify, or remit, with or without conditions, any civil penalty which may be imposed under this section. The amount of such penalty, when finally determined, or the amount agreed upon in compromise, may be deducted from any sums owing by the United States to the person charged.

JUDICIAL REVIEW

SEC. 211. Any order issued by the Board under this title shall be subject to review by the appropriate court of appeals of the United States, or the United States Court of Appeals for the District of Columbia, upon petition filed within 60 days after the entry of such order by any person aggrieved by the order. Such review shall be conducted in accordance with the provisions of chapter 7 of title 5, United States Code.

ANNUAL REPORT

SEC. 212. The Board shall report to the Congress on July 1 of each year. Such report shall include—

(1) a statistical and analytical summary of the investigations conducted and reviewed by the Board during the preceding calendar year;

(2) a survey and summary, in such detail as the Board deems advisable, of the recommendations made

by the Board to reduce the likelihood of occurrence of events which could significantly affect the health or safety of the public, together with any response to such recommendations made by the Nuclear Regulatory Commission;

(3) a detailed appraisal of the steps undertaken by the Nuclear Regulatory Commission to investigate and prevent nuclear incidents potentially harmful to the public health and safety;

(4) such recommendations for legislative and administrative actions relating to nuclear safety as the Board considers desirable; and

(5) such other matters as the Board considers appropriate to include in the report.

SUNSET PROVISIONS

SEC. 413. The Board shall cease to exist six years after the date of the enactment of this Act.

AUTHORIZATION OF APPROPRIATIONS

SEC. 414. There are authorized to be appropriated to carry out this subtitle $2,600,000 for each of the the fiscal years ending September 30, 1981, and September 30, 1982. Such sums shall remain available until expended.

APPENDIX C

Subsections 404 (6) and (7) of

H.R. 6390, as originally introduced

(6) The Board shall assess the effectiveness of the Nuclear Regulatory Commission in monitoring the operations of facilities which it regulates and in providing for construction and operating procedures which result in safe nuclear facilities. The Board shall also assess the effectiveness of other Federal, State, and local agencies concerned with safety at facilities regulated by the Nuclear Regulatory Commission, and of private parties (such as the operators of such facilities) in preventing, and in responding to, events which could significantly affect the health or safety of the public. The Board shall publish its findings in the Federal Register.

(7) The Board shall monitor the Nuclear Regulatory Commission's resolution of safety issues, and propose timetables for the Commission for dealing with such issues.

APPENDIX B

THE OFFICE OF NUCLEAR SAFETY

A Study of the Legislative Authority Needed
To Create an Office Within the Nuclear Regulatory
Commission That Would be Responsible for Investigating
Significant Nuclear Operational Events

Prepared for Brookhaven National Laboratory
Pursuant to Contract Number 174599-S

By Marcus A. Rowden and Sam E. Fowler
Fried, Frank, Harris, Shriver & Kampelman

November 12, 1984

TABLE OF CONTENTS

INTRODUCTION

This report, prepared under contract for the Brookhaven National Laboratory ("Brookhaven"), examines whether changes or additions to the U.S. Nuclear Regulatory Commission's (NRC) existing statutory authority are needed for the NRC to establish an internal organization, to be called the Office of Nuclear Safety (ONS), which would investigate significant operational events at nuclear facilities licensed by the NRC.

As outlined by Brookhaven, the ONS would be functionally comparable to the National Transportation Safety Board and would have:

- priority jurisdiction over the investigation of significant nuclear operational events at NRC-licensed facilities;
- authority to find facts, analyze and evaluate information, determine probable cause, and make recommendations to the NRC concerning operational events at NRC-licensed facilities;
- authority and responsibility for the coordination of the operational event investigation actions of the NRC's Office of Inspection and Enforcement, Office of Nuclear Reactor Regulation, and regional offices;
- power to subpoena evidence pertaining to operational events; and

power to conduct non-adjudicatory hearings.

The ONS would be headed by a director, and would report directly to the Commission.

This report is limited to considering the changes in the NRC's existing statutory authority that would be necessary to establish such an organization, and the effect of separation of functions and *ex parte* requirements and of the Government in the Sunshine Act on the ONS's ability to investigate operational events.

This report supplements a previous report prepared for Brookhaven by the authors, entitled "The Nuclear Safety Board," which examined the powers needed by, and the additional legislative authority required to create, an investigative organization independent of the NRC.

LEGISLATIVE AUTHORITY

Whether legislation is needed to establish the ONS within the NRC entails consideration of three separate issues:

(1) whether legislation is required to establish a new office within the NRC;

(2) whether legislation is required to authorize the NRC to perform the functions that would be carried out by the ONS; and

(3) whether, in any event, legislation is desirable to ensure the independent status of the ONS.

A. The Need for Additional Legislation to Create an Office Within the NRC for Investigating Significant Nuclear Operational Events

The NRC possesses broad authority to establish internal offices and administrative units to carry out the functions of the agency. Section 161d. of the Atomic Energy Act of 1954 authorizes the Commission "to appoint ... such officers and employees as may be necessary to carry out the functions of the Commission,"1/ and section 201 of the Energy Reorganization Act of 1974 authorizes the Commission's Chairman to appoint agency personnel and distribute "business among such personnel and among administrative units of the Commission."2/ Reorganization Plan No. 1 of 1980 contemplates

---

1/ 42 U.S.C. §2201(d).

2/ 42 U.S.C. §5841(a)(2).

that agency offices may be "duly established by statute or by the Commission."3/

The NRC's authority to create internal offices seems clear. Of the NRC's four program offices, only three -- the Office of Nuclear Reactor Regulation, the Office of Nuclear Material Safety and Safeguards, and the Office of Nuclear Regulatory Research -- were established by statute.4/ Two other program offices -- the Office of Inspection and Enforcement and the Office of Standards Development (which was later consolidated in the Office of Nuclear Regulatory Research) -- were established by the Commission, without legislation.5/ Indeed, in 1979, the NRC asked Congress to enact legislation "that would provide statutory recognition" for the Office of Inspection and Enforcement. The NRC argued that such statutory recognition was desirable because the Office of Inspection and Enforcement was "equal in importance to [the three] statutory offices and exceed[ed] all of them in size...."6/ Although Congress has continued to appropriate funds for inspection and enforcement, it has declined to

---

3/ Section 1(b)(1) and (2), 5 U.S.C.A. App. at 147.

4/ 42 U.S.C. §§5843-5845.

5/ U.S. Nuclear Regulatory Commission, Annual Report 1975, p. 4.

6/ Nuclear Regulatory Commission Authorizations for Fiscal Year 1980: Hearings Before the Subcomm. on Energy and the Environment of the House Comm. on Interior and Insular Affairs, 96th Cong., 1st Sess. 397-406 (1979).

enact the requested legislation -- presumably, because such statutory recognition is unnecessary to the lawful existence of the office and the performance of its duties.

Moreover, only three NRC offices other than the statutory program offices -- the Office of General Counsel,7/ the Advisory Committee on Reactor Safeguards,8/ and the Atomic Safety and Licensing Panel9/ -- were created by statute. All other NRC offices, including five staff offices reporting directly to the Commission, seven staff offices reporting to the Executive Director for Operations, five regional offices, and the Atomic Safety and Licensing Appeal Board, have been established without legislation.

In sum, additional legislation is not needed to establish an office within the NRC, assuming the office would only be responsible for exercising authority already possessed by the NRC. The creation of an internal office would, of course, be subject to applicable personnel ceilings and budgetary restraints.

B. The Need for Additional Legislation Authorizing Such Office to Perform the Desired Functions

The authors' October 12, 1984 report entitled "The Nuclear Safety Board" identified various powers that an independent Nuclear Safety Board would require to fulfill the mission of investigating significant nuclear operational

---

7/ 42 U.S.C. §2035(b).

8/ Pub. L. No. 85-256, §5 (1957), codified at 42 U.S.C. §2039.

9/ Pub. L. No. 87-615, §1 (1962), codified at 42 U.S.C. §2241.

events. This section examines whether the NRC currently possesses comparable powers that could be delegated to the ONS, or whether additional legislation would be required to accomplish such result. Whether additional legislation is desirable, in any event, to ensure that ONS can exercise its authority independent of the influence of other NRC staff units is discussed in the ensuing section.

1. Investigation and Inspection Authority. The NRC already possesses authority under section 161c. of the Atomic Energy Act to "make such ... investigations, [and] obtain such information ... as the Commission may deem necessary or proper to assist it in exercising any authority provided in this Act, or in the administration or enforcement of this Act, or any regulations or orders issued thereunder."10/ In addition, the NRC possesses specific authority to inspect the records and premises of both facility and materials licensees, as well as those of vendors and component suppliers, pursuant to its regulations and license conditions.11/

2. Authority to Conduct Hearings. The NRC already possesses authority under section 161c. of the Atomic Energy Act of 1954 to hold hearings, administer oaths to witnesses,

---

10/ 42 U.S.C. §2201(c). *See also* 42 U.S.C. §5846 (authority to inspect firms "constructing, owning, operating, or supplying the components of any facility or activity which is licensed or otherwise regulated" by the NRC).

11/ *See, e.g.*, 10 C.F.R. §§50.70 (facility licensees), 70.55 (special nuclear materials licensees), 21.41 (vendors and component suppliers).

pay witnesses' expenses, and issue subpoenas to compel the attendance and testimony of witnesses and the production of evidence.12/

Whether ONS could, without additional legislative authority. "conduct non-adjudicatory hearings for probable cause determination" (one of the questions posed by Brookhaven) is less clear. The Administrative Procedure Act (APA), which governs the conduct of NRC proceedings, distinguishes between two types of proceedings: informal rulemaking proceedings, which require informal, rather than trial-type, procedures;13/ and adjudicatory and formal rulemaking proceedings, which require formal, trial-type procedures.14/ In general, the courts have held that "proceedings designed to adjudicate disputed facts in particular cases," as opposed to proceedings that result in policy-type rules or standards, require the use of trial-type procedures.15/ The courts have generally held, however, that investigative proceedings, which merely ascertain facts and do not result in enforcement orders, licensing decisions, or other final agency actions, are not "adjudications" requiring trial-type procedures.16/ Indeed, the Attorney General's

---

12/ 42 U.S.C. §2201(c).

13/ 5 U.S.C. §553.

14/ 5 U.S.C. §§554, 556.

15/ United States v. Florida East Coast Railway Co., 410 U.S. 224, 245 (1973).

16/ International Telephone and Telegraph Corp. v. Local 134, International Brotherhood of Electrical Workers, 419 U.S. 428 443 (1975): "investigatory proceedings, no matter how formal, which do not lead to the issuance of an order containing the (cont'd)

Manual on the APA specifically stated that an investigation leading to a determination of the probable cause of an aircraft accident was not an adjudication requiring trial-type procedures.17/ Accordingly, it appears that the NRC can use non-adjudicatory procedures for the conduct of hearings investigating the probable cause of operational events.

3. Authority to Grant Immunity. The NRC, with the approval of the Attorney General, possesses authority to grant immunity from criminal prosecution to witnesses where necessary to obtain information material to an accident investigation from such witnesses.18/ Unlike the statutes governing the National Transportation Safety Board (NTSB), however, no federal law prohibits the use as evidence of NRC reports on nuclear accidents or operational incidents in suits or actions for damages growing out of matters mentioned in such reports.19/ Accordingly, additional legislation

---

(cont'd)
element of a final disposition... do not constitute adjudications," (quoting the Attorney General's Manual on the APA). *See also*, *United States v. International Longshoremen's Ass'n*, 246 F.Supp. 849, 885 (S.D. N.Y. 1964). "When a body is created for the sole purpose of finding facts which may subsequently be used as the basis of executive action, there is no requirement to provide a judicial or quasi-judicial type hearing."

17/ Attorney General's Manual on the Administrative Procedure Act, p. 40 (1947).

18/ 18 U.S.C. §§6001-6004; 42 U.S.C. §5814 (h).

19/ *See* 49 App. U.S.C. §1903(c). Section 190 of the Atomic Energy Act, however, provides that "[n]o report by any licensee of any incident arising out of or in connection with a licensed activity made pursuant to any requirement of the Commission shall be admitted as evidence in any suit or action for damages growing out of any matter mentioned in such report." 42 U.S.C. §2240.

would be needed to preclude use of ONS reports as evidence in subsequent litigation.

4. Authority to Obtain Official Data. Unlike an independent Nuclear Safety Board, an internal ONS would not require statutory authority to compel other NRC offices to disclose to it information possessed by such offices that may be necessary to ONS investigations.20/

5. Authority to Establish Reporting Requirements and Impose Civil Penalties for Violation of Such Requirements. The NRC already possesses extensive authority to require persons involved in the construction or operation of nuclear facilities to submit to the agency reports on significant nuclear events or operational incidents, and to impose civil penalties for the violation of reporting requirements.21/

6. Authority to Preserve Evidence. NTSB has specific statutory authority to prescribe regulations for the preservation of aircraft accident evidence.22/ Although the Atomic Energy Act does not contain similar, specific provisions, the NRC does possess broad authority to "prescribe such regulations or orders as it may deem necessary ... to govern any activity

---

20/ The Privacy Act, which prohibits the disclosure of personal records except under certain specified circumstances, authorizes the disclosure of such records "to those officers and employees of the agency which maintains the record who have a need for the record in the performance of their duties." 5 U.S.C. §552a (b)(1).

21/ 42 U.S.C. §§2201(o) and 5846.

22/ 49 App. U.S.C. §§1441(d) and 1472(p).

authorized pursuant to [the Atomic Energy] Act ... in order to protect health and to minimize danger to life or property."23/

7. Authority to Determine Which Events Warrant Investigation. The NRC already possesses plenary authority under section 161c. of the Atomic Energy Act to determine which events warrant investigation.24/

8. Authority to Request the NRC to Perform Investigations. Unlike an independent Nuclear Safety Board, an internal ONS would not require statutory authority to request the NRC to perform investigations and report findings to it. Nonetheless, it may be desirable for the Commission to authorize ONS to call upon other offices of the NRC to perform certain investigative services for, and report findings to, the ONS. The Commission, in any event, should clearly define the respective roles of the various NRC offices with investigative responsibilities.

9. Authority to Analyze Operational Data. The NRC currently possesses -- and exercises through its Office for Analysis and Evaluation of Operational Data (AEOD) -- authority to analyze operational safety data from NRC-licensed activities. Creation of ONS would, of course, necessitate consideration of whether AEOD should remain separate and independent from

---

23/ 42 U.S.C. §2201(i)

24/ 42 U.S.C. §2201(c). See City of Antonio v. CAB, 374 F.2d 326, 329 (D.C. Cir. 1967)("[n]o principle of administrative law is more firmly established than that of agency control of its own calendar").

ONS or whether the two offices should be combined.

10. Authority to Obtain Autopsy and Other Medical Information. Unlike the NTSB, the NRC presently does not possess specific authority to order autopsies, or to obtain copies of reports on autopsies performed by State or local officials, on persons who may have died as a result of a nuclear accident. Nor does the NRC have specific authority to obtain the results of medical tests performed on persons injured in nuclear accidents.

11. Additional Substantive Powers. The NRC plainly possesses sufficient authority to direct its offices to conduct special studies pertaining to nuclear safety, to consider and evaluate safety suggestions, to recommend to the NRC specific measures that might minimize the likelihood of occurrence of nuclear accidents or operational events, and to prepare reports recommending specific safety measures.25/

In sum, except for the power to obtain autopsy or medical records and to preclude the use of accident investigation reports as evidence in judicial proceedings, it appears that the NRC already possesses sufficient statutory authority to perform the principal functions of an NTSB-type investigative organization, and that such authority and related enforcement powers could be delegated to an internal NRC office.

25/ 42 U.S.C. §2201(c).

C. Whether Additional Legislation Is Desirable to Assure the Independent Status of the Office

Notwithstanding the fact that legislation may not be required for the NRC to create an office within the agency to investigate nuclear accidents and significant operational events, it may be desirable to provide statutory recognition to the ONS. Statutory recognition would enhance the status of the office, the stature of the functions it performs, and its independence from influence by other staff units within NRC. Legislation could also assure a direct and unimpeded line of reporting authority to the Commissioners themselves.

Accordingly, it may be desirable to seek legislation expressly giving statutory recognition to the ONS. Any such legislation would, presumably, provide how the office's Director would be appointed and removed, specify to whom the Director would report, and expressly establish the responsibilities and authorities of the office and its jurisdiction over accident investigations relative to those of other NRC offices.

In addition, the legislation might include the following: a provision obligating the office to make public every report of an accident or event investigation, special study, and recommendation made to the Commission; a provision affirming that the ONS shall be independent of other NRC offices and officers in the exercise of its functions; and a provision requiring the office to make periodic reports to Congress on the conduct of its functions. Section 5 of the Department of Transportation Act of 1966, which established the NTSB as an "independent tribunal" within the Department of Transportation, provides the most germane model for such provisions.26/

26/ Pub. L. No. 89-670, §5.

SEPARATION OF FUNCTIONS

ONS investigations can be expected to result, at least in some cases, in the initiation of an NRC enforcement action against the persons responsible for causing the nuclear accident or significant operational event investigated by ONS. Accordingly, a question arises as to whether the relationship between the ONS staff investigating the accident or event and the NRC officials adjudicating any consequent enforcement case would be consistent with so-called "separation of functions" requirements.

The separation of functions requirements of the Administrative Procedure Act are based on the notion that fairness requires that the persons who hear and weigh the evidence in an adjudicatory proceeding be different from, and independent of, the persons who have investigated and prosecuted the case.27/

27/ See Administrative Procedure in Government Agencies, Report of the Committee on Administrative Procedure, Appointed by the Attorney General at the Request of the President, To Investigate the Need for Procedural Reform in Various Administrative Tribunals and To Suggest Improvements Therein, S.Doc. No. 8, 77th Cong., 1st Sess., pp. 55-59 (Jan. 22, 1941).

The APA incorporates the separation of functions approach recommended by the Attorney General's Committee on Administrative Procedure, which was chaired by Dean Acheson. The Attorney General's Committee noted that the separation of functions doctrine, carried to its logical conclusion, would result in the separation of investigative functions and adjudicatory functions into totally separate and independent agencies. The Attorney General's Committee decisively rejected that course, however, after

> counting ... the costs which such a program would entail. These costs include substantial dangers both to private

(cont'd)

Thus, the APA provides that "[a]n employee or agent engaged in the performance of investigative or prosecuting functions for an agency in a case may not, in that or a factually related case, participate or advise in the decision, recommended decision, or agency review" except in certain specified circumstances.28/ In addition, the APA provides that the agency "employee who presides at the reception of evidence" in an adjudicatory proceeding may not "be responsible to or subject to the supervision or direction of an employee or agent engaged in the performance of investigative or prosecuting functions for an agency."29/ The NRC has incorporated the above-described APA requirements in the separation of functions provisions of its rules of practice.30/

(cont'd)

> and public interests. Most obvious are the disadvantages of sheer multiplication of separate governmental organizations. If the proposal were rigorously carried out, two agencies would grow in each case where one grew before.
>
> Particularly in cases where adjudicatory functions are not a principal part of the agency's work or are closely interrelated with other activities, whatever gains might result from separation would be plainly outweighed by the loss in consistency of action as a whole.
>
> ... To divorce entirely the investigating and enforcing arm from the deciding arm, may well impart additional confusion to [the regulatory] process.

28/ 5 U.S.C. §554 (d).

29/ Id.

30/ 10 C.F.R. §2.719.

Separation of functions requirements would not preclude the creation of an internal investigations office nor should it impede the effective conduct of the office's functions.

As to the office's creation, it is well established that both investigative and adjudicatory functions may be combined in a single agency. Indeed, the National Transportation Safety Board is responsible both for investigating aircraft accidents and for reviewing on appeal any Federal Aviation Administration decision to suspend, amend, modify, revoke, or deny an aircraft operating certificate or license, even though the FAA decision may have been prompted by the aircraft accident investigated by the NTSB.31/

As respects performance, both the APA and NRC separation of functions rules would preclude ONS personnel from participating -- except as witnesses or counsel in public proceedings -- in the decision or review of adjudications involving matters investigated by such personnel.32/ In addition, ONS staff could not supervise or direct the presiding officer in such

---

31/ Pangburn v. CAB, 311 F.2d 349, 356-358 (1st Cir. 1962). The Pangburn case involved the Civil Aeronautics Board rather than NTSB. Prior to 1966, authority to investigate aircraft accidents and to review Federal Aviation Administration decisions to revoke, suspend, or modify aviation licenses, which is now exercised by NTSB, was vested in the Civil Aeronautics Board.

32/ 5 U.S.C. §554(d); 10 C.F.R. §2.719.

adjudications.33/ As we understand the ONS concept, however, these restrictions should not interfere with the ONS's mission of investigating nuclear accidents and significant operational events. We assume that any decisions to grant, suspend, revoke, or modify a license, impose a civil penalty, or otherwise adjudicate rights following a nuclear accident or significant operational event, would continue to be made by members of the Atomic Safety and Licensing Board Panel, the Atomic Safety and Licensing Appeal Panel, the Commission, or a specially designated officer -- but not by the ONS or an employee thereof.

The separation of functions rule could pose an unacceptable obstacle to the ONS's mission if the rule were interpreted as precluding the NRC from receiving, considering, or acting upon ONS recommendations for safety improvements. We see, however, no support for such an interpretation in either the applicable law, the plain meaning of the NRC's separation of functions rule, or past agency practice.34/ As we understand the ONS proposal, ONS reports on nuclear accidents and operational events, probable cause determinations, and recommendations for safety improvements would be placed on the public

---

33/ Id.

34/ See Pangburn v. CAB, 311 F.2d 349, 356-358 (1st Cir. 1962).

record. Any party to a subsequent enforcement proceeding would, of course, be afforded an opportunity to controvert any statement of fact or opinion expressed in such a report.35/

35/ 10 C.F.R. §2.719 (d).

EX PARTE RESTRICTIONS

The concept of "ex parte" communications is closely related to that of separation of functions. Both are intended to minimize the possibility that an agency decisionmaker in an adjudicatory proceeding may be unduly influenced by off-the-record communications. Whereas the separation of functions rules are designed to prevent agency decisionmakers from being unduly influenced by agency investigators or prosecutors, ex parte restrictions are designed to prevent interested persons outside the agency from contacting or influencing the agency decisionmakers in the absence of, and without notifying, all other interested persons.36/

The APA provides that, in an adjudicatory proceeding,

> no interested person outside the agency shall make or knowingly cause to be made to any member of the body comprising the agency, administrative law judge, or other employee who is or may reasonably be expected to be involved in the decisional process of the proceeding, an ex parte communication relevant to the merits of the proceeding.37/

The statute defines an "ex parte communication" to include any "oral or written communication not on the public record with respect to which reasonable prior notice to all parties is not given...."38/ In addition, the APA precludes agency

---

36/ See, e.g., Draft Report of the Regulatory Reform Task Force, SECY-82-447, pp. 2-3 (Nov. 3, 1982).

37/ 5 U.S.C. §557(d).

38/ 5 U.S.C. §551 (14).

officials potentially involved in the decisional process of a proceeding from entertaining such ex parte communication. If the decisionmaker does receive an ex parte communication, the APA requires him or her to place a copy of the communication, if written, or a written memorandum of any oral ex parte communication, in the public record of the proceeding.39/ The NRC has reflected the APA requirements in its rules of practice.40/

As we envision the operation of the ONS, the office will need to communicate freely with, and obtain information from, a wide range of sources, including the management and employees of the nuclear facility investigated, the reactor vendor, component suppliers, construction workers, private citizens, and federal, state, and local officials.41/ To the extent that APA or NRC ex parte restrictions would limit the ONS's ability to obtain information from such sources to formal "on the record" proceedings, such restrictions would pose a severe obstacle to the performance of the ONS mission.

Neither the APA nor the NRC ex parte rules appear, however, to support such a restrictive interpretation. Under the APA, the ex parte restraints apply only to adjudications

---

39/ 5 U.S.C. §557(d)(1)(C).

40/ 10 C.F.R. §2.780.

41/ See Sierra Club v. Costle, 657 F.2d 298, 400-401 (D.C. Cir. 1981)(citations omitted).

and formal rulemaking proceedings, where "rules are required by statute to be made on the record after opportunity for an agency hearing...."42/ As discussed in Part I of this report, investigative proceedings such as those conducted by NTSB -- and presumably ONS -- are not adjudications. In addition, we have assumed that although ONS would be authorized to hold investigative hearings, such hearings would be held at ONS's discretion; ONS would not be required by statute to conduct formal, on-the-record hearings. Accordingly, it seems clear that the APA's ex parte restrictions would not apply to information-gathering contacts between ONS personnel and persons outside the agency.

Similarly, because an ONS investigative hearing would not be a proceeding "for the issuance, denial, amendment, transfer, renewal, modification, suspension, or revocation of a license or permit," and because (as we understand ONS's proposed functions) ONS personnel would not "advise the Commissioners in the exercise of their quasi-judicial functions" in connection with such a proceeding, the NRC's ex parte rule would not appear to apply to ONS investigations.43/

42/ Marketing Assistance Program, Inc. v. Bergland, 562 F.2d 1305, 1309 (D.C. Cir. 1977). See Administrative Conference of the U.S., A Guide to Federal Agency Rulemaking, pp. 155-163 (1983).

43/ 10 C.F.R. §2.780(a).

GOVERNMENT IN THE SUNSHINE ACT

The Government in the Sunshine Act requires, with only a few narrow exceptions, all federal agencies headed by a collegial body to open all meetings to the public, to notify the public of the time, place, and purpose of meetings a week in advance, and to maintain transcripts of meetings which may have been closed to the public under the Act's limited exceptions.44/

This statute would not affect the operation of the ONS. By its terms, the Sunshine Act applies only to federal agencies "headed by a collegial body composed of two or more individual members, a majority of whom are appointed to such position by the President with the advice and consent of the Senate, and any subdivision thereof authorized to act on behalf of the agency."45/ As we understand the ONS concept, the ONS would be headed by a single director rather than a board or collegial body. Moreover, the courts have construed "any subdivision thereof" to mean a subdivision of the "collegial body" itself, and not staff offices or administrative units under the collegial body. Thus, for example, the U.S. Court of Appeals has held that the Sunshine Act does not apply to the NRC's

---

44/ 5 U.S.C. §552b.

45/ 5 U.S.C. §552b (a)(1).

Atomic and Safety Licensing Board but only to the Commission itself.46/ Accordingly, even if ONS were headed by a multi-member board, it would not be subject to the Sunshine Act.

46/ Hunt v. NRC, 611 F.2d 332 (10th Cir. 1979), cert. denied, 445 U.S. 906 (1979).

APPENDIX C
Comments on Draft Report

Copies of the draft report, "An Independent Safety Organization," dated November 15, 1984, were circulated to all of the relevant offices of the NRC, the ACRS, and other interviewees for their comments. Written comments were received from some of the interviewees with detailed discussion on the draft report.

The BNL Task Force, in preparing this final report, has reviewed the comments and, where appropriate, has taken the comments into consideration.

In order to show the diversity of opinion regarding the issue of an independent safety organization, the letters received as of February 12, 1985 are reproduced in this appendix. The letters from the following individuals are reproduced:

1. C. J. Heltemes, Director, AEOD, USNRC
2. J. D. McAdoo, Assistant Manager, Nuclear Safety Department, Westinghouse Electric Corp.
3. A. David Rossin, Director, Nuclear Safety Analysis Center, EPRI
4. S. C. Sholly, Technical Research Associate, Union of Concerned Scientists
5. E. R. Weiss of Harmon, Weiss & Jordan

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

December 17, 1984

Dr. Walter Kato
Deputy Chairman
Department of Nuclear Energy
Brookhaven National Laboratory
Upton, NY 11973

Dear Dr. Kato:

SUBJECT: NRC STAFF COMMENTS ON THE DRAFT BNL REPORT, "AN INDEPENDENT SAFETY ORGANIZATION"

Again, we appreciate your willingness to conduct the study for the NRC regarding the need for an independent organization to investigate operating events. We also recognize the extremely tight schedule for this study and the efforts necessary for BNL to complete the initial draft in mid-November 1984.

Enclosed for your information and use are the comments resulting from the NRC staff review of the draft report. Please consider them to the degree you feel appropriate in preparing the final report.

There are several general comments which seem to be common in the formal and informal reactions of the NRC staff members that reviewed the draft report. These are discussed below for your consideration in revising the draft report.

1. The report seems to say that the investigations being conducted within the NRC, and the related screening, assessment, and feedback activities, are generally adequate and effective. Thus, the question arises why BNL recommends that a new office be established and that the current organizational arrangement be abandoned. It is not clear whether the BNL recommendation is based primarily upon: (a) a need to correct current deficiencies; or (b) a desire to gain improvements in efficiency; or (c) a desire to increase the independence of certain activities in order to improve public perception and minimize the potential for a conflict of interest.

2. The estimated resources necessary to carry out the scope of responsibilities and associated activities of the new office seem to be substantially underestimated. There seems to be a very close parallel to the NTSB in terms of the scope of responsibilities, the total number of events involved, the nature and number of needed studies and investigations, and the recommended organizational structure; yet the estimated resources are about 15% of that used by NTSB.

Walter Kato

3. A number of the specific comments on the draft report relate to a need in several sections to clarify: (a) NRC office responsibilities and activities; and (b) the current status of NRC event reporting requirements (10 CFR 50.72 and 10 CFR 50.73). Should there be differences between your understanding and the enclosed comments; or should you need further information or reference documents, please let me know.

4. Needless to say, the report should be as factual as possible, and significant conclusions and statements should be well supported by details and examples. We understand that because of schedule constraints, BNL must use the information and opinions provided through interviews without complete verification. However, where it is necessary to state an opinion, it would be helpful if you would clearly note it as such and, to the degree possible, describe the basis for the opinion.

We are available to discuss the above general comments and the enclosed specific comments. Please let us know if further discussion would be helpful.

Additionally, after your review of the enclosed comments, we would appreciate knowing the estimated submittal date of your final report. For your information, our target schedule for submittal of the final report to the Commission is mid-January 1985.

If we can provide any additional assistance or clarification, please either contact me or Fred Hebdon in my office.

Sincerely,

C. J. Heltemes

C. J. Heltemes, Jr., Director
Office for Analysis and Evaluation
of Operational Data

Enclosure:
As Stated

cc w/enclosure:
W. Dircks, EDO
J. Roe, DEDO
T. Rehm, AO/EDO
V. Stello, DEDROGR
H. Denton, NRR
R. DeYoung, IE
J. Davis, NMSS
R. Minogue, RES
G. Cunningham, ELD
Regional Administrators

Westinghouse Electric Corporation

Water Reactor Divisions

Nuclear Technology Division

Box 355
Pittsburgh Pennsylvania 15230

January 3, 1985

NS-85-1249

Dr. W. Y. Kato
Deputy Chairman, Department of Nuclear Energy
Brookhaven National Laboratories
Upton, NY 11973

Dear Dr. Kato:

This is to acknowledge and partially respond to your invitation to comment on the draft report, "An Independent Safety Organization," which you forwarded last month.

We have only one comment on the significant event investigations section, specifically concerning the Salem automatic trip failure -- a subject on which we provided some data during your visit. Footnote 7 on page 53 can be construed to imply that EPRI-NSAC began an investigation and identified anomalies in the trip sequence of the February 22 event before the February 25 event intervened. We seriously question that this was the case. The trip on the 22nd was classified as a normal event; no LER was written, and plant management did not discover the anomalies until February 26th. It was our understanding that both events were investigated in parallel after that date.

To date, other commitments of key people have prevented us from completing our review of the sections dealing with the concept and legislative basis for the Independent Safety Organization. With your indulgence, we can provide any resulting comments in a week or so.

In general, the subject seems to have been well researched and presented. We greatly appreciate the opportunity to give you our views.

Very truly yours,

J. D. McAdoo,
Assistant Manager
Nuclear Safety Department

NUCLEAR SAFETY ANALYSIS CENTER

operated for the electric utility industry by the Electric Power Research Institute

January 4, 1985

Dr. Walter Y. Kato
Brookhaven National Laboratory
Upton, New York 11973

Dear Walt:

I have gathered comments from those you spoke with and from others who were asked to review the report.

The consensus is that your group has done a very good job of analyzing the problems and putting together a well-written and informative report. A few points are noted separately, but you may have picked these up in the editing.

I will attempt to synthesize our comments in terms of the three main issues addressed by the study: need for an independent organization, alternative structures, and legislative authority required.

1. The Need for an Independent Organization

The report recognizes, and we agree, that current organizations are fully capable and competent to investigate reactor accidents as far as the technical issues are concerned. Not all do a perfect job all the time, and it is unrealistic to expect that they would. Technical objectivity is good also, but the adversarial nature of the process, not just between NRC and licensees, but between utility and supplier, between utility, supplier and insurer, make this a unique and complex matter. [This is true without mentioning state regulatory commissions or political aspirants who choose to exploit nuclear issues.] Thus, the objective must be clear. Just to obtain valid technical information, a new structure is not essential.

That said, the fact must be faced that the current structure is not working well at all. This leads to the concerns expressed below about a Board reporting to the Commissioners or staff.

3412 Hillview Avenue
Post Office Box 10412
Palo Alto, CA 94303
(415) 855-2000

Another entity, however, would not replace anything. It would add expense, require experienced personnel, both permanent staff and "parties," and would inevitably add to the confusion. More important, it would add to the public skepticism about nuclear power, suggesting that it cannot be operated safely and that after all these years we still do not have adequate institutions to regulate it. The danger is a further erosion of public support. We note that the idea is not being championed by nuclear power's allies.

If a Board is desired, it would have to have independence from NRC. This would be essential if it is to critically evaluate the NRC policies, staff performance, Commissioner action, etc. One needs to review TMI to see just how these various groups would have been impacted by the existence of a Board.

Our fundamental conclusion is that a Board cannot solve anything until the basic problem is solved: The FAA is fundamentally responsible to ensure that commercial aircraft FLY safely, not just that they have safety features. The NRC has had an unrealistic mission from its inception, by being forced to ignore the costs of implementing its regulations (despite NEPA) and accepting no responsibility for the integrity (to say nothing of the cost) of the nation's nuclear power contribution to its electric energy supply. Unless NRC's mandate is made to include these responsibilities, structural changes or additions will not solve the problem.

2. Alternative Organizational Structures

As noted above, we are not persuaded that a new investigative Board would of itself make any meaningful improvement. We have nonetheless, reviewed the section about alternative structures, and our comments on that section are attached as an Appendix.

The recommendation that "freeze" be imposed on plants after accidents has as its objective the accumulation of all relevant data. In the case of airplane accidents, the destruction is so complete, that the accident autopsy is very slow and difficult. The thrust of nuclear plant procedures should be to expedite immediate pre-planned team response to accumulate relevant data rapidly. The idea of a freeze conveys suspicion that someone is trying to cover up. Regardless of its possible technical merits, the optics of a freeze requirement are so negative that it should be eliminated from all proposals involving any investigative board.

3. Legislative Requirements

The report suggests that a first step could be made within existing NRC authority. However, the Board that would emerge would then suffer from the very lack of independence we warn about above.

Unless Congress would create a Board with stability and independence, the intended mission would not be accomplished. Would Congress do so if nuclear power is involved? That is really the question. Unless there is confidence that the Congress would do so, the concept has little hope of achieving its stated purpose.

We are pleased to have been of assistance to you in gathering information for this report, and we thank you for the opportunity to provide these comments.

Sincerely,

Dave

A. David Rossin, Director
Nuclear Safety Analysis Center

ADR:jh
attachments

cc: J. Taylor
W. Loewenstein
W. Layman
G. Sauter

SPECIFIC ITEMS

1. NSAC/INPO: p.32: Eliminate the word "monthly" on line 32. Add "Responsibility to coordinate specific areas has been assigned to personnel in each organization."

2. NSAC provides comments on some SERs. (p. 36)

3. p. 53 footnote: That is Don Gillispie of INPO.

4. p. 109: FAA may be more adversarial than NTSB, but not than NRC. This just needs to be clarified.

5. There are several places, such as p. xii in the Executive Summary, when the report says that perhaps the fact that there is no public or political opposition to aviation is a significant difference. There is no perhaps about it, and it weakens the report to hedge on this point. The difference is crucial, because it impacts everything the report deals with. We urge you to edit this carefully throughout, and be forthright about it.

6. p. xii: Utilities are interconnected and have enough reserve margin and contingency plans to keep the public supplied with energy in the short term. Therefore, shutdowns of individual plants are not generally evident to the American people.

If the Board is to have any real impact, it should not report to the NRC at all. Experience suggests that an independent evaluation of the NRC's role is an important part of the investigation. Likewise, the Board must be free from Congressional pressure. History shows that pressure can come from various individual members of Congress, and this can undercut the perceived technical integrity of any investigation. This has been evident in aviation and other industries, as well as nuclear power.

The board could report to the Secretary of Energy, Commerce, or even Interior. The key is NOT NRC and NOT EPA and NOT Congress. The essential element is that the Board report to a high-ranking authority, even if some will accuse that authority of being concerned about the energy security of the nation. (One possibility would be a Presidential Commission, like the Kemeny Commission, but there is little hope for a standing group reporting to the President. Several entities, like the Grace Commission, have reported to the Vice-President.)

One of the best features of the FAA structure is the "parties" concept. This is how truly knowledgeable people can be utilized in the best interests of the public. In nuclear power today, this is unrealistic, unfortunately, based on the reactions of Congress and the media in the past. Nevertheless, if the Board concept is adopted, every effort should be made to include the "parties." Careful reading of recent NRC transcripts however, reveals that the staff is very indefinite about this concept. It can make sense in an investigation, but the staff talks about designated representatives paid by the utilities, to add to the "eyes and ears of NRC." This is not what is being proposed.

One of our commentators suggested that ACRS needs a new scope of activity, and that they might be given this function with full-time board members. Others feel that the ACRS charter is not the issue, and that they are not equipped to investigate events.

The entire discussion about the size of the Board's staff, as summarized on pages xv and xvi, gives much to be concerned about. If this body is to screen events and investigate a number of events every year, it is nothing more than AEOD is now, with INPO doing the same thing, even though they do occasionally split up the work by agreement. The number of events is a poor criterion to use. Granted, a number is needed to project workloads, but if this special Board is to be a substitute for AEOD, it is not needed.

If, on the other hand, the Board is to investigate the few real accidents or important precursors, that is another matter. A small group can be perfectly viable, even in a Washington atmosphere, if they are good, smart and serious.

If the accident is real, the Board would generate its own visibility. Unfortunately, the arguments summarized on p. xvi, that such a Board reporting to the Commissioners would have sufficient independence, are not convincing.

If a Board is proposed, it should have members who meet certain criteria of technical competence or represent an identified constituency, so that their bias is known in advance. They would have to have enough stature to command the respect of the "parties," and to speak directly when called up to report to the Commissioners or testify before Congress. They should serve for one term without eligibility for renomination. Independence is the key.

The recommendations include the concept of a first step or interim structure. We strongly urge against any halfway approach. Either the concept has merit and should be pursued fully or it should be rejected. The progressive development suggested on p. xvi is not a desirable or even a realistic concept in the area of nuclear power, despite the way it evolved at DOT. Hindsight may be better at DOT now, but the idea of a Board that might change does not seem prudent.

UNION OF CONCERNED SCIENTISTS 1346 Connecticut Avenue, N.W. • S. 1101 • Washington, DC 20036 • (202) 296-5600

17 January 1985

Mr. Eugene Weinstock
Building 197-C
Brookhaven National Laboratory
Upton, NY 11973

Dear Mr. Weinstock:

Pursuant to our earlier conversations, I am enclosing a copy of a memorandum dated 5/1/81 from Carlyle Michelson (then Director of AEOD) to Victor Stello (then Director of IE) concerning "Inadequate Licensee Event Reports". This memorandum gives three examples of events for which it was determined that the LERs did not provide a complete description of pertinent factors contributing to the severity of the events reported.

Of course, it is true that for the three events in question (the Indian Point Unit 2 containment flooding event of October 1980, the Sequoyah Unit 1 inadvertent containment spray event in February 1981, and the DC Bus failure incident at Millstone Unit 2 in January 1981) have been discussed in detail in other reports. The concern expressed in the Michelson memo (and the concern which I share) is that someone examining these LERs or performing a search of the LER data base would not necessarily be aware of the other reports, and might mistakenly dismiss them for one reason or another.

It is not entirely clear that the new LER rule would prevent the under-reporting of similar events in the future. You might wish to contact Fred Hebdon at AEOD (301-492-4484) for his views on this matter.

Another related concern that I have is that the new LER rule leaves to the judgment of the licensee the amount of detail reported concerning failures in related systems at the time of the failure of the system which necessitated the filing of an LER in the first place. For example, it is clear that closely related systems would be addressed in the LER. However, it is not clear, for example, that if failures in the high pressure injection system at a PWR caused the need for an LER report at the same time the containment fan cooler system was operating in a degraded mode (say because of biofouling reducing the heat removal capabilities of the fan cooler heat exchangers), that the latter problem would be addressed in the LER. It is certainly important for severe accident considerations to know the status of containment safeguards (i.e., sprays, containment heat removal, fan coolers, etc.) at the time of failures in core protective systems. As I noted in our telephone conversation, the Precursor Program (Oak Ridge National Laboratory/Science Applications, Inc.) has a similar limitation -- while core protective systems are considered, containment safeguards are excluded from the program.

Mr. Eugene Weinstock 17 January 1985

Such limitations are unfortunate in my opinion. It is quite clear that the status of containment safeguards are of paramount importance in the event of a severe accident (in terms of the likelihood and timing of containment failure and in terms of the likely source term resulting from the accident sequence).

I hope the enclosed memo is useful in your present project. If you have further questions, please do not hesitate to call or write.

Sincerely,

Steven C. Sholly

Steven C. Sholly
Technical Research Associate

ENCL: As stated

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

RECEIVED

C-13

MAY 1 1981

1981 MAY 19 AM 11:31

OFFICE OF THE SECRETARY
D.C.

50-411

MEMORANDUM FOR: Victor Stello, Jr., Director
Office of Inspection and Enforcement

FROM: Carlyle Michelson, Director
Office for Analysis and Evaluation
of Operational Data

SUBJECT: INADEQUATE LICENSEE EVENT REPORTS

In my memorandum of July 14, 1980, I expressed a concern that licensees are not providing an accurate and complete description of reactor operational events. Based on discussions with your staff and your memorandum of August 7, 1980, we are aware that you have been emphasizing more stringent enforcement of reporting requirements to ensure complete Licensee Event Reports (LERs). Enclosed for your information and discussed below are three additional examples of LERs which are clearly inadequate to ascertain the significance, cause, corrective action, and probable consequences of the events.

The LER (Enclosure 1) reporting the containment flooding event at Indian Point, Unit 2 omitted two vital pieces of information: first, that more than 100,000 gallons of brackish water accumulated undetected in containment; and second, the reactor vessel was partly submerged in relatively cool water while at full operating temperature and pressure. This LER is the licensee's second attempt to accurately report the event and is only a slight improvement over the reporting contained in the first LER (Enclosure 2).

The second example is the LER (Enclosure 3) reporting the containment spray event at Sequoyah, Unit 1. The LER did not mention that about 110,000 gallons of water from the reactor coolant system and the refueling water storage tank were sprayed undetected into containment. In addition, the LER failed to report that eight workers were contaminated, that there was a small radioactive release from the reactor building, that the ice beds were sprayed, and that some water accumulated in the reactor vessel cavity.

The third example is the LER (Enclosure 4) reporting an event at Millstone. The LER did not report the loss of the 125V DC bus, the opening of the PORV, the lockout of the second diesel generator, inadequate pressurizer spray, and the loss of annunciators. In addition, the LER should have been supplemented by additional information, i.e., sequence of events, to provide adequate understanding of the event.

5

In our opinion, these LERs indicate inadequate reporting which is a real concern to us. We recognize that substantive information concerning the events has been provided by the licensees in response to IE investigations; however, this information is usually not disseminated to other licensees and is not widely available within the NRC staff. An independent reviewer of the LER could not identify the significant aspects of the events. Consequently, the lessons learned from operational experiences cannot be properly evaluated and effectively fed back to operators. In addition, future operational safety evaluations will not have the full benefit of relevant reactor operating history if the events are not reported accurately to ensure that the event is properly characterized for identification and retrieval.

We strongly support your ongoing efforts to improve the accuracy of licensee reporting. We hope that these examples will help your efforts to enforce accurate event reporting.

C J Heltemes Jr for
Carlyle Michelson, Director
Office for Analysis and Evaluation
of Operational Data

Enclosures:
(1) Consolidated Edison of New York, Inc., LER 80-016/99X, Docket 50-247, dtd 12/27/80.
(2) Consolidated Edison of New York, Inc., LER 80-013/03L, Docket 50-247, dtd 11/14/80.
(3) Tennessee Valley Authority, LER 81-021/03L, Docket 50-327, dtd 3/11/81.
(4) Northeast Nuclear Energy Company, LER 81-005/3L, Docket 50-336, dtd 1/30/81.

CONTROL BLOCK: | | | | | | | (1) (PLEASE PRINT OR TYPE ALL REQUIRED INFORMATION)

01 | N Y I P S 2 (2) | 0 0 - 0 0 0 0 0 - 0 0 (3) | 4 1 1 1 1 (4) | | (5)
LICENSEE CODE | LICENSE NUMBER | LICENSE TYPE | CAT

CON'T
01 REPORT SOURCE L (6) | 0 5 0 0 0 2 4 7 (7) | 1 0 1 7 8 0 (8) | 1 1 2 2 8 0 (9)
DOCKET NUMBER | EVENT DATE | REPORT DATE

EVENT DESCRIPTION AND PROBABLE CONSEQUENCES (10)

02 While in the hot shutdown condition, a containment entry was made on
03 Oct. 17, 1980 to repair a defective power range channel. Upon entry,
04 it was discovered that water had accumulated on the containment floor,
05 in the containment sump and in the cavity under the reactor vessel. The
06 source of the water was service water leakage from the containment fan
07 cooler units. The water accumulated because both containment sump pumps
08 were found to be inoperable.

	SYSTEM CODE	CAUSE CODE	CAUSE SUBCODE	COMPONENT CODE	COMP SUBCODE	VALVE SUBCODE
09	S B (11)	E (12)	D (13)	H T E X C H (14)	C (15)	Z (16)

(17) LER/RO REPORT NUMBER	EVENT YEAR		SEQUENTIAL REPORT NO.		OCCURRENCE CODE	REPORT TYPE		REVISION NO.
	8 0	—	0 1 6	/	9 9	X	—	0

ACTION TAKEN	FUTURE ACTION	EFFECT ON PLANT	SHUTDOWN METHOD	HOURS (22)	ATTACHMENT SUBMITTED	NPRD-4 FORM SUB.	PRIME COMP. SUPPLIER	COMPONENT MANUFACTURER
B (18)	C (19)	G (20)	Z (21)	0 0 0 0	N (23)	N (24)	W (25)	X 9 9 9 (26)

CAUSE DESCRIPTION AND CORRECTIVE ACTIONS (27)

10 Sturtevant cooling coils and service water piping associated with the
11 fan cooler units developed leaks as a result of corrosion. Replacement
12 of the cooling coils for all five fan cooler units will be accomplished
13 before the unit is returned to service as well as a review of the design
14 and operation of the containment sump pumps.

	FACILITY STATUS	% POWER	OTHER STATUS (30)	METHOD OF DISCOVERY	DISCOVERY DESCRIPTION (32)
15	G (28)	0 0 0 (29)	NA	C (31)	Containment Entry

	ACTIVITY RELEASED	CONTENT OF RELEASE	AMOUNT OF ACTIVITY (35)	LOCATION OF RELEASE (36)
16	Z (33)	Z (34)	NA	NA

PERSONNEL EXPOSURES

	NUMBER	TYPE	DESCRIPTION (39)
17	0 0 0 (37)	Z (38)	NA

PERSONNEL INJURIES

	NUMBER	DESCRIPTION (41)
18	0 0 0 (40)	NA

LOSS OF OR DAMAGE TO FACILITY (43)

	TYPE	DESCRIPTION
19	Z (42)	NA

PUBLICITY

	ISSUED	DESCRIPTION (45)	NRC USE ONLY
20	Y (44)	Press releases starting 10-21-80	

NAME OF PREPARER John M. Makepeace PHONE: 914-739-8823

8010310127

0 1 | N Y I P S 2 | 0 0 - 0 0 0 0 0 - 0 0 | 4 1 1 1 1 | 1 D
LICENSEE CODE — LICENSE NUMBER — LICENSE TYPE — CAT

CON'T
0 1 | REPORT SOURCE L | 0 5 0 0 0 2 4 7 | 1 0 1 7 8 0 | 1 1 1 4 8 0
DOCKET NUMBER — EVENT DATE — REPORT DATE

EVENT DESCRIPTION AND PROBABLE CONSEQUENCES (10)

0 2 During full power operation, it was observed that power range nuclear
0 3 instrumentation channel N42 indication was drifting. A power reduction
0 4 was initiated in conjunction with continued monitoring, circuitry
0 5 testing and incore flux mapping. Incore flux data indicated normal
0 6 power distribution and verified a defective detector. The channel was
0 7 then placed in the trip condition in accordance with Tech. Spec. 3.5.
0 8

SYSTEM CODE	CAUSE CODE	CAUSE SUBCODE	COMPONENT CODE	COMP. SUBCODE	VALVE SUBCODE
I A	E	E	I N S T R U	E	Z

LER/RO REPORT NUMBER	EVENT YEAR		SEQUENTIAL REPORT NO.		OCCURRENCE CODE	REPORT TYPE		REVISION NO.
	8 0	—	0 1 3	/	0 3	L	—	0

ACTION TAKEN	FUTURE ACTION	EFFECT ON PLANT	SHUTDOWN METHOD	HOURS	ATTACHMENT SUBMITTED	NPRD-4 FORM SUB.	PRIME COMP. SUPPLIER	COMPONENT MANUFACTURER
C	E	B	Z	0 0 0 3	N	N	N	W 1 2 0

CAUSE DESCRIPTION AND CORRECTIVE ACTIONS (27)

1 0 A Westinghouse power range detector, Model No. WL-23686, became de-
1 1 fective due to moisture within its connector resulting from service
1 2 water leakage into containment. Following replacement, the new detector
1 3 and cables were satisfactorily tested for resistance to ground. Further
1 4 testing will be accomplished when the unit is returned to power

FACILITY STATUS	% POWER	OTHER STATUS	METHOD OF DISCOVERY	DISCOVERY DESCRIPTION
E	1 0 0	NA	A	Control Room Instrumentation

ACTIVITY RELEASED	CONTENT OF RELEASE	AMOUNT OF ACTIVITY	LOCATION OF RELEASE
Z	Z	NA	NA

PERSONNEL EXPOSURES

NUMBER	TYPE	DESCRIPTION
0 0 0	Z	NA

PERSONNEL INJURIES

NUMBER	DESCRIPTION
0 0 0	NA

LOSS OF OR DAMAGE TO FACILITY

TYPE	DESCRIPTION
Z	NA

PUBLICITY

ISSUED	DESCRIPTION	NRC USE ONLY
Y	Related press release dated 10-21-80	

8011180679

NAME OF PREPARER John M. Makepeace PHONE 914-739-8823

REPORT SOURCE L (6) 0 5 0 0 0 3 3 6 (7) 0 1 0 2 8 1 (8) 0 ...
DOCKET NUMBER — EVENT DATE — REPORT DATE

EVENT DESCRIPTION AND PROBABLE CONSEQUENCES (10)

0 2 During a diesel generator (D/G) response to a loss of normal power, a D/G service
0 3 flange leaked. The leak wetted the engine causing a diesel trip. The leak also
0 4 the amphenol plug on the Woodward Govenor causing the plug to fail. The facilit
0 5 erated in accordance with Technical Specification Action Statement 3.8.1.1.d for
0 6 imately 6 hours. At which time operability of the other D/G was demonstrated and
0 7 plant operated within Action Statement 3.8.1.1.a until cold shutdown was achieved
0 8 No Similar LER's

SYSTEM CODE	CAUSE CODE	CAUSE SUBCODE	COMPONENT CODE	COMP. SUBCODE	VALVE SUBCODE
W A (11)	B (12)	C (13)	P I P E X X (14)	C (15)	Z (16)

(17) LER/RO REPORT NUMBER

EVENT YEAR		SEQUENTIAL REPORT NO.		OCCURRENCE CODE	REPORT TYPE		REV. NO.
8 1	—	0 0 5	/	0 3	L	—	0

ACTION TAKEN	FUTURE ACTION	EFFECT ON PLANT	SHUTDOWN METHOD	HOURS (22)	ATTACHMENT SUBMITTED	NPRD-4 FORM SUB.	PRIME COMP. SUPPLIER	COMPONENT MANUFACTURER
B (18)	Z (19)	Z (20)	Z (21)	0 0 0 0	N (23)	Y (24)	L (25)	P

CAUSE DESCRIPTION AND CORRECTIVE ACTIONS (27)

1 0 During a recent outage the D/G service water piping was modified. The failed
1 1 had been improperly compressed causing the gasket to be blown-out during the s
1 2 pressure surge when the D/G was started. The gasket and amphenol plug were re
1 3 A verification of proper compression was made on the remaining flanges in the
1 4 rooms.

	FACILITY STATUS	% POWER	OTHER STATUS (30)	METHOD OF DISCOVERY	DISCOVERY DESCRIPTION (32)
1 5	X (28)	0 0 0 (29)	DURING RX TRIP	A (31)	OPERATOR OBSERVATION

	ACTIVITY RELEASED	CONTENT OF RELEASE	AMOUNT OF ACTIVITY (35)	LOCATION OF RELEASE (36)
1 6	Z (33)	Z (34)	NA	NA

PERSONNEL EXPOSURES

	NUMBER	TYPE	DESCRIPTION (39)
1 7	0 0 0 (37)	Z (38)	NA

PERSONNEL INJURIES

	NUMBER	DESCRIPTION (41)
1 8	0 0 0 (40)	NA

LOSS OF OR DAMAGE TO FACILITY (43)

	TYPE	DESCRIPTION
1 9	Z (42)	NA

PUBLICITY

	ISSUED	DESCRIPTION (45)
2 0		NA

NRC USE ONLY

Dupe — 8102100634

LICENSEE CODE 14 15 LICENSE NUMBER 25 26 LICENSE TYPE 30 57 CAT 58

CON'T

[1] REPORT SOURCE L (6) 0 5 0 0 0 3 2 7 (7) 0 2 1 1 8 1 (8) 0 3 1 1 8 1 (9)

60 61 DOCKET NUMBER 68 69 EVENT DATE 74 75 REPORT DATE 80

EVENT DESCRIPTION AND PROBABLE CONSEQUENCES (10)

[2] Unit 1 in mode 5. The unit operator stopped reactor coolant pumps 1 and 2. Since

[3] reactor coolant pumps 3 and 4 and residual heat removal pump 'B' were also not in

[4] service at this time, the unit entered LCO 3.4.1.3.a and LCO 3.4.1.3.b. There was

[5] no effect upon public health or safety. Previous occurrences - none.

[6]

[7]

[8]

SYSTEM CODE	CAUSE CODE	CAUSE SUBCODE	COMPONENT CODE	COMP. SUBCODE	VALVE SUBCODE
C B (11)	X (12)	Z (13)	P U M P X X (14)	B (15)	Z (16)

(17) LER/RO REPORT NUMBER	EVENT YEAR		SEQUENTIAL REPORT NO.		OCCURRENCE CODE	REPORT TYPE		REVISION NO.
	8 1	—	0 2 1	/	0 3	L	—	0

ACTION TAKEN	FUTURE ACTION	EFFECT ON PLANT	SHUTDOWN METHOD	HOURS (22)	ATTACHMENT SUBMITTED	NPRD-4 FORM SUB.	PRIME COMP. SUPPLIER	COMPONENT MANUFACTURER
X (18)	Z (19)	Z (20)	Z (21)	0 0 0 0	N (23)	N (24)	N (25)	W 1 2 0

CAUSE DESCRIPTION AND CORRECTIVE ACTIONS (27)

[10] The unit operator stopped reactor coolant pumps 1 and 2 for pump protection when the

[11] RCS pressure went to zero after the RHR containment spray isolation valve was inadver-

[12] tently opened. The RHR 'A' pump was running prior to the opening of the valve and the

[13] RHR 'B' pump was started approximately 4 minutes after the valve was opened. Reactor

[14] coolant pumps 1 and 2 were returned to operable status in approximately 1 hour

FACILITY STATUS	% POWER	OTHER STATUS (30)	METHOD OF DISCOVERY	DISCOVERY DESCRIPTION (32)
[15] X (28)	0 0 0 (29)	NA	Z (31)	NA

ACTIVITY RELEASED	CONTENT OF RELEASE	AMOUNT OF ACTIVITY (35)	LOCATION OF RELEASE (36)
[16] Z (33)	Z (34)	NA	NA

PERSONNEL EXPOSURES

NUMBER	TYPE	DESCRIPTION (39)
[17] 0 0 0 (37)	Z (38)	NA

PERSONNEL INJURIES

NUMBER	DESCRIPTION (41)
[18] 0 0 0 (40)	NA

LOSS OF OR DAMAGE TO FACILITY (43)

TYPE	DESCRIPTION
[19] Z (42)	NA

PUBLICITY

ISSUED	DESCRIPTION (45)	NRC USE ONLY
[20] N (44)	NA	

Name of Preparer J.M.McGriff/G.B.Kirk Phone (615) 842-8317

0317O413

HARMON, WEISS & JORDAN
2001 S STREET, N.W.
SUITE 430
WASHINGTON, D.C. 20009

GAIL McGREEVY HARMON
ELLYN R. WEISS
WILLIAM S. JORDAN, III
DIANE CURRAN
DEAN R. TOUSLEY

TELEPHONE
(202) 328-3500

February 7, 1985

Walter Y. Kato
Deputy Chairman
Brookhaven National Laboratory
Associated Universities, Inc.
Upton, Long Island
New York 11973

Dear Mr. Kato,

Thank you for sending me a copy of the draft of your report, "An Independent Safety Organization." After reviewing it, I debated whether it would serve any purpose to send you my comments since it is quite obvious that Mr. Sholly's and my interview with you had little if any impact on the report. However, when I received a phone call from Mr. Weinstock late in January asking me the most basic questions about NRC's mistreatment of the so-called "Hartman allegations" - charges of falsification of leak rate calculations to which Metropolitan Edison pled guilty almost a year ago - I was sufficiently disturbed to write to you. Your draft report was written two months ago, containing a section on TMI investigations which makes no mention of the leak rate falsification , and I frankly cannot understand why Mr. Weinstock is only now attempting to check what we told him before the draft was written.

You recommend against an independent safety review board based on the central conclusion that "NRC investigations are carried out in a professional and competent manner, and satisfy their regulatory objectives." Abstract, p. ix. That conclusion in turn, is based on a wholly superficial "review" of a few incidents. Indeed the "review" is such a generalized description of events that it is little more than a statement that an investigation took place. You do not provide the facts necessary to judge the adequacy of any of the investigations. There is no sense in which this work could be characterized as a "study."

Concerning the case I am most familiar with, TMI-2, it is inconceivable that even a superficial review of that case could omit a discussion of the leak rate falsification issue -- the Hartman allegations -- considering that this led to the first felony conviction of a utility for violation of the Atomic Energy Act in the history of the nuclear power program. To state the facts very briefly, Harold Hartman, a former TMI-2 operator, informed IE in May, 1979, within two months of the accident, that required leak rate calculations had been systematically falsified at TMI-2 for months up to the accident. There is much evidence that this contributed to the accident by desensitizing operators to indications of valve leakage. IE did no further investigation. No mention of the issue is contained in IE's voluminous 1979 accident investigation. A member of the Rogovin group, Harold Ornstein, interviewed Hartman and substantiated the substance of his charges but his report was not included in the Rogovin report.

Indeed, no further action was taken until March 1980, when news accounts of the Hartman allegations appeared. IE then conducted a brief investigation which resulted in referral to the Department of Justice. Although an NRC licensing board was at that time holding hearings on the utility's competence and integrity, the NRC staff did not take its evidence to the Board, making a sham of the hearing process. Indeed, IE ceased its activities again, resuming them only in mid-1983. The NRC's actions in this case have been sharply criticized by the Department of Justice and the United States attorney for Central Pennsylvania, who stated to the U.S. District Court:

> We are the only institution since the accident occurred that has made the slightest damn effort to see this thing through to a conclusion.... The NRC has not conducted any meaningful investigation; to this day has used as a pretext the fact that the Grand Jury was conducting an investigation as a vehicle to avoid addressing its responsibilities. U.S.A v Metropolitan Edison (M.D.Pa.) Criminal Docket No. 83-00188, Transcript of Proceedings, p.63.

A beginning source could be NUREG-0680, Supplement 5, Chapter 8, an official NRC document published in 1984.

The fact is that IE ignored charges, now proven, of criminal activity in the TMI case. Nor is this an isolated incident of inadequate investigation. UCS is in the process of finalizing a review of NRC's performance which contains a chapter detailing investigative failures in TMI and other cases, including Zimmer and Diablo Canyon. I will send you a copy when it is completed within the next two weeks; you should be most interested in Chapter 5.

As you no doubt understand by now, I am very disappointed in the quality of your report. I should also mention that I challenge the propriety of your hiring as a major consultant Marcus Rowden, who he left his post as Chairman of the NRC in 1977 and has since represented the nuclear power industry, playing a major role in their lobbying activities. The report you prepared was specifically requested by Congress and can be expected to play a major role in an important public policy debate. In my view, it is wholly inadequate for that purpose. While I did not and do not expect Brookhaven to endorse my opinions or those of my clients, I did expect, and Congress is entitled to, a competent and fair exposition of the relevant facts. Your report does not contain this.

Very truly yours,

Ellyn R. Weiss

Ellyn R. Weiss

cc: Senator Biden

NRC FORM 335 (11-81)

U.S. NUCLEAR REGULATORY COMMISSION

BIBLIOGRAPHIC DATA SHEET

1. REPORT NUMBER (Assigned by DDC)
NUREG/CR-4152
BNL-NUREG-51858

4. TITLE AND SUBTITLE (Add Volume No., if appropriate)
AN INDEPENDENT SAFETY ORGANIZATION

2. (Leave blank)

3. RECIPIENT'S ACCESSION NO.

7. AUTHOR(S) W. Y. Kato, E. V. Weinstock, J. F. Carew, R. J. Cerbone, J. G. Guppy, R. E. Hall and J. H. Taylor

5. DATE REPORT COMPLETED

MONTH	YEAR
February	1985

9. PERFORMING ORGANIZATION NAME AND MAILING ADDRESS (Include Zip Code)
Department of Nuclear Energy
Brookhaven National Laboratory
Upton, New York 11973

DATE REPORT ISSUED

MONTH	YEAR
February	1985

6. (Leave blank)

8. (Leave blank)

12. SPONSORING ORGANIZATION NAME AND MAILING ADDRESS (Include Zip Code)
Office for Analysis & Evaluation of Operational Data
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

10. PROJECT/TASK/WORK UNIT NO.

11. FIN NO.
D-1358

13. TYPE OF REPORT
FORMAL

PERIOD COVERED (Inclusive dates)

15. SUPPLEMENTARY NOTES

14. (Leave blank)

16. ABSTRACT (200 words or less)

Brookhaven National Laboratory has conducted a study on the need and feasibility of an independent organization to investigate significant safety events for the Office for Analysis and Evaluation of Operational Data, USNRC. This is being carried out in response to a Congressional request to the NRC for such a study.

The study consists of three parts: the need for an independent organization to investigate significant safety events, alternative organizations to conduct investigations, and legislative requirements. The determination of need was investigated by reviewing current NRC investigation practices, comparing aviation and nuclear industry practices, and interviewing a spectrum of representatives from the nuclear industry, the regulatory agency, and the public sector.

The advantages and disadvantages of alternative independent organizations were studied, namely, an Office of Nuclear Safety headed by a director reporting to the Executive Director for Operations (EDO) of NRC; an Office of Nuclear Safety headed by a director reporting to the NRC Commissioners; a multi-member NTSB-type Nuclear Safety Board independent of the NRC. The costs associated with operating a Nuclear Safety Board were also included in the study.

The legislative requirements, both new authority and changes to the existing NRC legislative authority, were studied. These legislative requirements were based upon the Edwards-Udall Bill H.R. 6390 introduced in the 96th Congress and a study of the NRC Organization Act.

17. KEY WORDS AND DOCUMENT ANALYSIS

17a. DESCRIPTORS

Nuclear incident investigation
Nuclear accident investigation
Nuclear Safety Board

17b. IDENTIFIERS/OPEN-ENDED TERMS

18. AVAILABILITY STATEMENT
Unlimited

19. SECURITY CLASS (This report)
Unclassified

20. SECURITY CLASS (This page)

21. NO. OF PAGES

22. PRICE

NRC FORM 335 (11-81)

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300

FOURTH CLASS MAIL
POSTAGE & FEES PAID
USNRC
WASH D.C
PERMIT No. G 67

120555078877 1 1AN
US NRC
ADM-DIV OF TIDC
POLICY & PUB MGT BR-PDR NUREG
W-501
WASHINGTON DC 20555