U.S. CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD

BUDGET JUSTIFICATION & ANNUAL PERFORMANCE PLAN

Fiscal Year 2003

Summary

For Fiscal Year (FY) 2003, the U.S. Chemical Safety and Hazard Investigation Board (the Board or the CSB) requests a budget of $9 million. This budget compares to $7.85 million appropriated for FY 2002. The requested increase of $1.15 million will largely support funding for a new Chairperson, Board member, and Chief Operating Officer. All three positions are expected to be filled during FY 2002.[1] The remaining increase will support the hiring of additional technical staff (accident investigators and other safety specialists), in accordance with Congressional direction to focus the majority of our resources on accident investigations. If the Board is funded for FY 2003 at or near $7.85 million, the new, mandatory executive positions will need to be funded by reducing program funds currently directed to investigations.

Even at its current funding level, the Board is unable to investigate a number of serious chemical incidents due to a lack of resources. Examples of these serious, life-threatening incidents are described in the text. A modest investment by the Congress to hire additional CSB investigative staff can allow the agency to better protect workers and the public from the dangers of industrial chemical accidents.

Mission

Accidental chemical releases represent a serious problem, causing death and suffering as well as economic damage of at least $4 to $5 billion per year. The Board is working to prevent chemical accidents through investigations, recommendations, and advocacy. However, the agency's current resources are not sufficient to the task. With additional resources, the Board can more effectively fulfill its mission to promote the prevention of major chemical accidents at fixed facilities.

According to reports filed with the U.S. Environmental Protection Agency (EPA), some 14,500 regulated facilities experienced a total of 1,913 hazardous chemical accidents between 1994 and 1999 – an average of just over one accident a day. To be reported, an accident must have a serious impact, such as deaths, injuries, public evacuations, or significant property or environmental damage. In fact these 1,913 accidents caused 33 deaths and more than 2,000 injuries. Moreover, most industrial facilities fall outside the scope of the EPA reporting program. According to the U.S. Agency for Toxic Substances and Disease Registry (ATSDR), fixed facilities in just 13 states experienced over 4,000 accidental hazardous releases in a single year.[2]

[1] Two Board seats, including the Chair, are currently vacant, though nominations may be expected in the next several months. In addition, the Senior Executive Service position of Chief Operating Officer (COO) is currently vacant and is held on an acting basis by the General Counsel. An SES recruitment process is underway to fill the COO position.

[2] Figures from the 1997 Hazardous Substances Emergency Events Surveillance (HSEES) database, representing information compiled by state government officials. Incidents associated with petroleum products are excluded.

Beyond the almost daily toll of chemical incidents, there remains the ever-present possibility of a large-scale event that would threaten a significant number of people. In the aftermath of September 11th, much attention has been focused on the potential of a large-scale chemical release (either accidental or deliberate) to harm the American public. Europe is now dealing with the aftermath of just such an occurrence: the September 21, 2001, ammonium nitrate explosion at a chemical plant in Toulouse, France, which killed 30 and damaged hundreds of city buildings. Initially considered an act of terrorism, the explosion has now been determined by French authorities to have been an accident. No U.S. federal agency presently has sufficient staff and resources to conduct an adequate root cause investigation of a chemical accident of this magnitude.

CSB Recommendations Catalyze Change

In a variety of industries throughout the country, the CSB is working to promote the safety of workers and the public by reducing the number and severity of chemical accidents. Some of the latest developments are described below.

CSB's Study of Reactive Chemical Hazards Points to Gaps in Safety. When the CSB issued its final report on the Morton Chemical explosion in August 2000, the agency faced a dilemma. Some stakeholders were calling for immediate new regulation of processes like the one at Morton, where two relatively stable materials reacted together violently, rupturing a chemical reactor and injuring nine workers. Others felt that current regulations and procedures were adequate for controlling reactive hazards. Responding to this controversy, the agency launched a comprehensive study of the problem, now nearing completion.

The study uncovered some 167 serious reactive incidents in the United States from 1980 to 2001. These incidents caused over 100 fatalities. The incidents occurred across companies of all sizes and included events during storage and distribution as well as manufacturing. The study has identified gaps in both the existing good-practice standards for reactive hazards and in the suggested regulatory schemes for mitigating these hazards. The Board will soon request public testimony from stakeholders on how best to address the problem. The Board believes it will significantly advance the cause of safety through this process.

Steel Mill Maintenance Procedures to be Strengthened. On February 2, 2001, two workers at the Bethlehem Steel Burns Harbor Division mill in Indiana were fatally burned when a pipe doused them with highly flammable gas condensate. Four others were injured, one with serious internal burns. The CSB responded immediately, ultimately sending seven investigators to the scene. Eleven months later, the CSB issued its final report on the case, noting significant systemic problems in how the large facility planned and supervised hazardous maintenance operations. The report with its ten safety recommendations earned praise not only from survivors, but also from the Bethlehem Steel Corporation, which stated: "… the Board's findings are both fair and accurate. We appreciate their help and expertise in responding to the incident. Furthermore, we believe

that all of the Board's recommendations already have been implemented or are in the process of being implemented at Burns Harbor."[3]

CSB Bulletin Draws Attention to General Safety Issues. The CSB's 2001 bulletin on Management of Change examined two serious chemical incidents, in Maryland and Washington State. In each case, workers confronted an unforeseen situation while attempting to turn around process equipment between manufacturing cycles. The hazards of the situations were not well understood; actions taken in one case led to an explosion and injuries, in the other case to multiple deaths. The CSB's Safety Bulletin explained that a systematic method for "managing change" could have helped prevent both accidents. Management of Change, as this process is formally known, is already a recognized element of good safety practice. However the occurrence of these recent accidents suggests that better implementation is required.

CSB Case Study Examines Hazards of Hydroxylamine. Another new CSB product, issued in 2002, examines an explosion involving hydroxylamine, a semiconductor manufacturing aid that is unstable in high concentrations. The massive blast occurred at a Pennsylvania startup company that was testing a new manufacturing process for the chemical. Although the explosive properties of hydroxylamine were known, the plant was sited in a light industrial park adjacent to unrelated businesses. Four workers were killed, in addition to an employee of an adjoining company. Among other issues, the Case Study draws attention to the importance of safely locating highly hazardous chemical manufacturing operations.

CSB's Current Budget (FY 2002)

The Board's FY 2002 appropriation was approximately $7.85 million. Of this sum, over half ($4.7 million) is allocated to staff compensation and benefits. The agency's core department, the Office of Investigations and Safety Programs, employs 13 staff. The majority are highly trained engineers, safety specialists, and investigators. Many of these individuals held senior positions in the private sector, and their recruitment to the CSB is one of the agency's most significant accomplishments of the past 18 months. Training, retaining, and developing these staff members remains a high priority. The remainder of the current budget supports Board and staff travel, office rental, equipment, and supplies, in addition to contractual support ($1.8 million). Many functions, such as laboratory and forensic analyses, are contracted to outside experts. Because of the modest size of the agency, certain functions such as payroll, procurement, and personnel administration support are contracted to other federal agencies.

CSB Needs More Resources to Fulfill Its Mission

In FY 2000, the CSB produced its first 5-year strategic plan, in accordance with the Government Performance and Results Act. The plan, which was vetted before a wide group of stakeholders, sets forth a number of areas for further development. The CSB's

[3] http://www.bethlehemsteel.com/newsroom/releases/2002/jan16_1.shtml

constituents were in general agreement that the CSB should focus on investigative work and seek to increase the number of accident investigations it conducts each year.

However, investigations are very demanding of labor and resources. To be useful and to fulfill our statutory mandate, CSB investigations must ferret out the root causes of accidents. Determining the root causes requires a detailed analysis of complex technological and organizational systems. CSB investigations involve extensive interviews and document analysis. Each CSB investigation takes the dedicated efforts of a multidisciplinary team. An investigation team typically consists of about seven staff, including a highly trained investigator-in-charge and several senior engineers or other technical specialists. With the CSB's budget hovering at $7.5 to $8 million over the last 3 years, the agency is severely limited in its ability to hire any additional investigators.

Since its founding in 1998, the CSB has put in place most of the administrative personnel and infrastructure required to run an independent federal agency and support the investigative and safety mission. The Board could undertake a number of additional investigations each year without significantly increasing its administrative overhead. What is chiefly required is a modest additional investment in new investigative and safety staff.

The depth of the shortage in investigative personnel is illustrated by events in July 2001. Most investigators were already doing double-duty, serving on multiple investigative teams. Two teams were investigating fatal accidents at Bethlehem Steel and BP Amoco, and another team was in the middle of the ongoing hazard investigation of reactive chemicals. The following events then occurred:

- On July 9, an explosion at the UDS oil refinery in Three Rivers, Texas, released potentially deadly hydrofluoric acid, causing burns to several workers and forcing the evacuation of a large section of the surrounding town.

- On July 11, a cylinder ruptured at an Air Products manufacturing facility near Tulsa, Oklahoma, releasing about 40 pounds of deadly arsine, a gaseous derivative of arsenic. More than 100 people were hospitalized, including a number from outside the fence line.

- On July 14, a railcar containing poisonous methyl mercaptan caught fire and exploded during unloading at the Atofina chemical plant in Riverview, Michigan. Three workers died from methyl mercaptan intoxication, nine were injured, and 2,000 people were evacuated.

- On July 17, a storage tank containing spent sulfuric acid at a Delaware City refinery caught fire and collapsed. Between 600,000 and 1,000,000 gallons of the powerful corrosive were released, much of it reaching the Delaware River. One worker was killed, and eight were injured.

These four accidents over a period of just eight days greatly overtaxed the agency's existing resources. Each of these events was sufficiently serious to merit a field assessment, if not a full-scale investigation. The CSB was under significant pressure to take action, with various members of Congress and others calling for investigations. The hydrofluoric acid and arsine releases each had a potential to cause public casualties. However, because the Board lacked the necessary resources, these serious incidents could not be investigated. In the case of the Michigan chemical accident, the CSB deployed an assessment team but did not conduct a full investigation.[4] The CSB deployed an assessment team and then a full investigative team to the Delaware City refinery accident. However, this deployment came at a high price to the agency since all the investigative personnel were pulled from other urgent, ongoing investigations. The need to constantly shift personnel in this way delays the completion of reports. *If an event were to occur on the scale of the recent Toulouse tragedy (see above), the CSB would be stretched far beyond its current staff resources.*

Thus, the agency's highest internal priority over the next few fiscal years is to hire more investigative staff. By FY 2003, however, it will cost between $8.5 and $8.75 million simply to maintain the agency at its current level of operations.[5] A modest increase to $9 million will allow the Board to recruit new staff and to conduct more investigations.

With increased funding, the CSB can also dedicate more resources to its recommendations program. To achieve real improvements in safety, CSB's recommendations must be thoroughly implemented by agencies, companies, and others. Implementation is not automatic, however. The CSB's recommendations program provides a mechanism for tracking and evaluating progress in implementation. A strong and enduring recommendations follow-up system is one of the keys to the success of the NTSB in improving transportation safety. Successful advocacy requires diligence in maintaining contacts with recommendation recipients and in evaluating progress. Although the CSB has made notable progress in getting its recommendations adopted, the agency's formal recommendations program remains critically understaffed.

[4] Because the accident was found to involve the unloading of a railcar, the NTSB is now conducting an investigation. The CSB has the statutory authority to investigate or co-investigate such cases but currently lacks the resources.

[5] The expected appointment of two new Board Members and a new Chief Operating Officer during FY 2002 will significantly increase the agency's baseline budget.

BUDGET REQUEST

Overall –

The Board's budget request for FY 2003 is $9 million.[6] This represents a 15 percent increase over its FY 2002 appropriation of $7.85 million. Approximately $550,000 of the increase is for additional personnel costs related to the expected appointment of two new Board members and the hiring of a full-time SES-level Chief Operating Officer. An additional $228,000 will fund an anticipated 2003 civil service cost-of-living increase. Most of the remaining $400,000 increase will fund the hiring of critically needed new investigators and safety staff.

Key Components –

The key components of the Board's total budget are 64 percent for personnel (salary and benefits), 19 percent for support contracts, and 7 percent for rent. In a deliberate effort to limit the growth of its budget and to use the majority of its funds in support of its mission goal, the Board outsources most of its administrative activities. This allows the maximum number of positions to be allocated to investigations and safety programs staff. Whenever possible, the Board buys, through support contracts, specific technical expertise (e.g., laboratory tests on evidence from an incident scene) in lieu of building that particular capability, thus conserving resources.

Challenges –

- Personnel. The Board began operation in January 1998 as a new entity, without transference of staff and infrastructure from an existing federal agency. Hiring personnel who are ready to lead a new kind of chemical investigation has proven to be a great challenge. The CSB has had to recruit and train its staff largely from outside the government. The first cadre of staff recruited after the CSB reorganized in January 2000 has now proven it can accomplish the mission and do so faster than was previously achieved. The agency now needs to recruit a number of additional individuals of similar technical skill.

- Technical Training. Even the most gifted recruits may need supplemental training to conduct the Board's unique, systems-oriented investigations. The Board's goal is to provide appropriate training to each individual. CSB investigations require techniques and analyses that go beyond those generally used to conduct typical public and private sector investigations. The CSB training program teaches how to analyze evidence and to identify the root and contributing causes of incidents.

[6] As authorized in its enabling statute, the Board, as an independent agency, is authorized to submit its own budget request directly to the Congress, simultaneously transmitting a copy to the Executive Branch.

- Outreach. The Board is a small agency attempting to influence the behavior of huge industries. To improve safety performance, CSB reports must be disseminated to a wide audience and understood. Accordingly, the agency must be creative in trying to reach the broadest audience. Several new initiatives are either planned or underway. For example, in 2002 the Board will conduct a joint workshop with the National Institute of Environmental Health Science, Worker Education and Training Program, to promote the use of Board reports in hazardous worker training exercises.

- Data Inadequacies. The United States presently lacks any comprehensive national data system simply to track the occurrence of accidental chemical releases. Individual government agencies have separate reporting requirements and maintain separate databases. Efforts at uniting these databases (by the CSB and others) have not been fruitful. The lack of reliable accident data hampers the CSB and other agencies from measuring national progress in accident reduction and identifying emerging hazards.[7]

[7] The CSB is planning a stakeholder roundtable during 2002 to address aspects of the problem and may, subject to funding availability, recruit a full-time data analyst to facilitate the agency's use of existing data sources.

FY 2003 APPROPRIATION LANGUAGE

CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD
Federal Funds

General and Special Funds

CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD
SALARIES AND EXPENSES

For necessary expenses in carrying out activities pursuant to section 112(r)(6) of the Clean Air Act, as amended, including hire of passenger vehicles, uniforms or allowances therefore, as authorized by 5 U.S.C. § 5901 – 5902, and for services authorized by 5 U.S.C. § 3109 but at rates for individuals not to exceed the per diem equivalent to the maximum rate payable for senior level positions under 5 U.S.C. § 5376, $9,000,000, $6,500,000 of which is to be available until September 30, 2003 and $2,500,000 of which is to be available until September 30, 2004: Provided, that the Chemical Safety and Hazard Investigation Board shall have not more than three career Senior Executive Service Positions.

CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD
FISCAL YEAR EXPENSES
(in thousands of dollars)

	FY 2001 Actual	FY 2002 Budget	FY 2003 Request
Personnel compensation & benefits	$3,670	$4,660	$5,800
Travel and transportation of persons	107	366	436
Transportation of things	17	4	5
Space rental	568	600	623
Communications, utilities and miscellaneous charges	154	95	98
Printing and reproduction	46	63	54
Other services	1,128	1,806	1,718
Supplies and materials	164	214	219
Equipment	17	42	47
Land and structures	--	--	--
Total obligations	$5,871[8]	$7,850	$9,000

[8] The CSB's FY 2001 expenditures were lower due to several factors: (1) two Board seats were vacant throughout the year; (2) investigations were completed more cheaply than was forecast; (3) the Board adhered to a partial hiring freeze due to budgetary uncertainties; (4) a number of positions were filled part way through the year; and (5) the new investigations were launched toward the latter part of the year.

ANALYSIS OF CHANGE

(in thousands of dollars)

FY 2002 Appropriation	$ 7,850

Summary of Adjustments to Base and Built-In Changes:

Personnel Cost Increases[1]

Additional costs for hiring two Board Members and a Chief Operating Officer	550
Additional costs for hiring investigators and safety staff	362
Estimated cost of January 2003 pay increase[2]	228
Total increase to personnel costs	1,140

Non-Personnel Cost Increases

Space rental	23
Travel and transportation of persons	70
Transportation of things	1
Communications, utilities, and miscellaneous charges	3
Printing and reproduction	(9)
Other services: investigative consulting +119; non-investigative support services (268); and training +61	(88)
Supplies and materials	5
Equipment	5
Land and structures	0
Total increase to non-personnel costs	10

Total Adjustments to Base	**$1,150**
FY 2003 Appropriation Request	**$9,000**

[1] Benefits are calculated at 26 percent of base pay.
[2] FY 2003 pay increase estimated at 4.9 percent of base pay.

ANALYSIS OF CHANGE
(Significant Adjustments)

***Personnel Costs**:* Staffing levels will increase from 45 to 48 full-time positions to achieve the planned accomplishments for FY 2003. An increase of $550,000 is required for the appointment of two new Board Members and the hiring of a full-time SES-level Chief Operating Officer. Additional funding of $362,000 is required to fund the hiring of critically needed investigators and safety staff. An increase of $228,000 is required to fund a projected January 2003 pay increase.

Space Rental: Space rental costs will increase by $23,000 in FY 2003. This is a result of the scheduled 2 percent rent increase of $12,000 and offsite investigative space of $11,000.

***Travel and Transportation of Persons**:* The increase of $70,000 is a result of increased cost of an additional investigation and related administrative support travel.

***Printing and Reproduction**:* The decrease of $9,000 is a result of reduced advertising for investigator positions.

Other Services: The Board plans a decrease of $88,000 in Other Services. This is the net result of an increase in consultants to support investigative activity planned for this year ($119,000) and a reduction of non-investigative support of $268,000. Also, investigative training increases by $57,000, and administrative training increases by $4,000.

Supplies and Materials: The increase of $5,000 is a result of an increase of $21,000 in investigative supplies and a reduction of $16,000 in administrative supplies.

Equipment: The increase of $5,000 is needed to support the new investigators and safety staff.

PERFORMANCE PLAN

The CSB's performance plan for FY 2003 reflects the 5-year Strategic Plan that was developed during FY 2000 in consultation with stakeholders and other interested parties, and adopted by the Board members on September 29, 2000.

This performance plan explains how the Board's overarching mission and enabling goals that were identified in our strategic plan will be addressed during FY 2003. The Board's overarching goals are:

- **Mission Goal** – Promote the prevention of chemical accidents.

- **Enabling Goal** – Enhance management of the CSB and establish a diverse, highly skilled, productive workforce.

Resources requested for FY 2003 will be used in support of these two goals. Aside from general infrastructure expenditures, funds will be used almost entirely for technical personnel (Board staff and contractors), expenses, and support activities associated with conducting investigations and promoting the prevention of accidents.

The CSB is faced with many challenges in FY 2003. Recruiting and developing technical staff remains one of the Board's biggest challenges. Although the CSB has filled 13 positions in the Office of Investigations and Safety Programs, there are currently five positions to be filled. In addition two Board seats (including the Chair) and the position of COO[9] are vacant, as are four positions in the Office of Prevention, Outreach, and Policy. As the CSB strives to carry out its primary mission of promoting the prevention of chemical accidents, the challenge of developing the technical staff directly affects the agency's ability to be as productive and efficient as possible. One of the key elements of developing the staff is training them to conduct incident investigations, which require techniques and analyses that go beyond those generally used to conduct typical public and private sector investigations.

[9] Filled on an acting basis by the General Counsel.

Mission Goal: Promote the prevention of chemical accidents.

The Board believes that accomplishing its mission depends on the application of state-of-the-art investigative procedures, production of timely investigation reports, development of well-reasoned and precisely targeted recommendations, design and completion of complementary hazard investigations, and interaction with professional and technical organizations involved in the prevention of accidental chemical releases. Investigative and research efforts need to be focused where they can provide the greatest benefit in preventing accidents. The performance goals identified in support of this strategic goal will enable the Board to meet this challenge. Our processes and procedures require ongoing evaluation and improvement to ensure that the resources provided are justified and give value to the public.

Performance Goal #1

Produce timely, high quality investigation reports, recommendations, and other technical reports.

Performance Indicators

- Four major investigations initiated
- Three major investigation reports completed

Operational Processes

To meet this performance goal, the CSB will:

- Hire additional investigators and safety staff
- Implement training programs to develop technical staff
- Conduct coordination meetings with other federal investigative agencies
- Conduct public Boards of Inquiry for selected investigations

Validation

Performance will be verified and validated by:

- Number of investigations initiated and reports issued
- Data from surveys, questionnaires, and documented interviews of stakeholders on the effectiveness of investigations

Performance Goal #2

Develop effective outreach and partnerships with stakeholders

Performance Indicators

- Acceptance of 70 percent of CSB safety recommendations
- National recognition for taking steps that contribute to the prevention of chemical accidents
- Partnerships with stakeholders that promote the prevention of chemical accidents
- Wide distribution of CSB papers/publications

Operational Processes

To meet this performance goal, the CSB will:

- Conduct a public meeting to review recommendations status
- Conduct presentations on CSB investigations at ACC, API, CCPS, and other national safety conferences
- Issue timely safety alerts as appropriate on current investigations
- Implement a prevention outreach strategy

Validation

Performance will be validated by the number of CSB safety recommendations accepted and implemented

Performance Goal #3

Implement a system for chemical accident data collection and analysis that can be used to measure prevention effectiveness

Performance Indicators

- Stakeholder consensus on key metrics, methodologies, and requirements for chemical accident data collection and analysis

Operational Processes

To meet this performance goal, the CSB will:

- Initiate design for data system proposal
- Conduct a multistakeholder roundtable meeting to review proposal

Validation

Performance will be verified and validated by stakeholder consensus on the data system proposal.

Enabling Goal: Enhance management of the CSB and establish a diverse, highly skilled, productive workforce.

The Board believes that, if best management practices are emphasized every day throughout every activity, a professional and efficient atmosphere will exist where other agency program goals can be accomplished. Good management practices dictate that the organization be well run, competent, technically accurate, flexible, and timely, to ultimately benefit both the employees and the taxpayers.

Performance Goals

- Clearly delineate roles, responsibilities, and accountabilities for Board members and staff
- Develop and implement administrative and personnel policies, including family friendly policies
- Complete organizational, information technology, and physical infrastructure

Performance Indicators

Evaluation of roles and interface among Board members and staff

Operational Processes

To meet these performance goals, the CSB will:

- Incorporate new leadership and Board members
- Continue implementation of hiring plan
- Evaluate organizational structure and modify as necessary
- Implement training program to develop staff
- Address findings and recommendations of Inspector General

Validation

Performance will be verified and validated by:

- Total personnel on board consistent with each year's annual performance staffing plan
- Performance appraisals on a regular basis
- Board policies established in a timely manner
- Annual performance plans and performance reports submitted in a timely manner
- Training and individual development plans for all employees

APPENDIX

CSB History and Background

Although the United States has so far been spared a catastrophe on the scale of the Bhopal accident,[10] hazardous chemicals pose a serious, ongoing threat to public and worker health and safety. Since the 1947 Texas City fertilizer explosions,[11] which killed more than 500 people, the United States has experienced many thousands of significant chemical accidents. These accidents have killed workers, released harmful chemicals into the environment, damaged homes, and flattened factories. A series of fatal chemical explosions in the 1980s prompted Congress to enact the accident prevention provisions of the Clean Air Act. In addition to creating the Board, Congress directed EPA and OSHA to develop new accident prevention rules for industry. Future accidents would be investigated by an independent Chemical Safety Board, whose findings and recommendations would promote further improvements in the regulations and in safety practices.

The CSB has no enforcement powers and limited regulatory authority. The CSB is the lead federal agency for investigating accidental chemical releases at fixed facilities and reporting to the public on the causes of these accidents. The CSB is also authorized to conduct general studies of chemical accident hazards. On the basis of its reports and studies, the CSB makes recommendations to government, industry, and others to prevent future accidents.

The CSB was created by the Clean Air Act Amendments of 1990. However, the Board did not receive funding or begin operations until January 1998. The Board received an initial startup appropriation of $4 million, increasing to $7.85 million by FY 2002. The agency is headquartered in Washington, DC, and has three appointed Board Members[12] and a professional staff of 28.

[10] On December 3, 1984, a Union Carbide pesticide plant in Bhopal, India, accidentally released approximately 40 metric tons of methyl isocyanate into the atmosphere. The release caused an estimated 2,000 fatalities, 100,000 injuries, and significant damage to livestock and crops. Up to 50,000 people remain partially or totally disabled from exposure to the toxic gas.

[11] On April 16, 1947, two ships carrying ammonium nitrate fertilizer bound for Europe exploded in the harbor of Texas City, Texas, devastating the city and killing hundreds of residents. This transportation-related incident underscores the damage possible from hazardous materials. The Texas City disaster has been described as the worst industrial accident in U.S. history.

[12] Two Board seats are currently vacant, including the position of Chairperson.

How CSB Works to Prevent Accidents

When a chemical accident occurs at a fixed facility, the CSB is routinely notified by the National Response Center or the National Transportation Safety Board (NTSB),[13] or through other channels. Accidents are scored using the CSB's incident selection criteria, developed in 1999 with extensive input from stakeholder groups. The score reflects the severity of accident consequences and how frequently the process involved in the accident is practiced, as well as the accident's potential to cause public injury. In case of a serious accident, the CSB may deploy a field team of investigators to perform an initial evaluation. Based on the overall assessment, agency staff and Board Members make the decision whether to conduct a full-scale investigation.

The goal of a CSB investigation is to determine the root causes and contributing factors underlying the accident and to develop recommendations for future prevention. Although each case differs in complexity, a field investigation may typically require several dozen witness interviews and the review of thousands of pages of company records, as well as laboratory or engineering studies associated with the physical evidence. The investigation is led by an investigator-in-charge and follows a detailed protocol developed by the agency. Investigators work diligently to coordinate their field activities with other agencies of jurisdiction. To promote coordination, the Board has signed memoranda of understanding (MOUs) with EPA; the Department of Labor's Occupational Safety and Health Administration (OSHA); the Bureau of Alcohol, Tobacco, and Firearms; and the Agency for Toxic Substances and Disease Registry. An agreement with the NTSB is also nearing completion.

The CSB normally sends a team about seven staff to an accident site. The team is supported from headquarters by other investigators, attorneys, and administrative staff. The field phase of an investigation usually takes several weeks. Thereafter, evidence is analyzed and the causes of the accident are determined using logical techniques. Usually, a serious accident is found to be the result of multiple, systemic failures. Working with recommendations specialists, the investigative team develops recommendations designed to prevent similar accidents from recurring in the future. A final report with recommendations is drafted by staff and presented to the Board Members for review and approval. Then, as described below, the Board and staff initiate an outreach program to promote implementation of the recommendations.

The CSB's goal is to complete accident investigations within 12 months of inception. Since 1998, the Board has completed seven major accident investigations and issued shorter safety bulletins/case studies on three additional cases. Three accidents that occurred during 2001-2002 remain under investigation.

When investigating a specific accident, the CSB may discover an underlying hazard that warrants broader investigation. When this occurs, the CSB will initiate a hazard investigation, which focuses on the hazard or a class of accidents rather than a particular

[13] The CSB has an agreement under which the NTSB, which maintains 24-hour surveillance of the news media, notifies the Board of any chemical accident potentially within its jurisdiction.

event. Hazard investigations may entail industry surveys, literature reviews, analyses of past accidents, interviews, and site visits. By understanding these common causes, the Board can formulate recommendations to reduce the hazards. The Board's first hazard investigation, on reactive chemicals, was initiated in the fall of 2000. The study grew out of the Board's Morton International accident investigation, which was one of a number of examples where two relatively stable materials reacted together violently to produce an explosion. Current regulations address individual hazardous substances, but are largely silent on the control of these more subtle reactive hazards.

Both accident investigations and hazard investigations lead to specific Board safety recommendations. Recommendations are the Board's principal tools for promoting chemical safety. Each recommendation has one or more specific recipients, who are the parties best able to carry out the recommended action. The Board's recommendation program, which was formally unveiled in fall 2001, is based on the NTSB model. The NTSB has issued more than 11,000 recommendations to improve transportation safety since 1967, with an acceptance rate in excess of 80 percent. The CSB is working toward acceptance of 70 percent of its recommendations.

In addition to developing recommendations, the CSB recommendations staff develops related outreach programs. Once the Board has issued a recommendation, the CSB recommendations staff encourages implementation and tracks compliance. The staff ensures that the recommendation is effectively communicated to the recipient(s), together with any needed justification or explanation. The staff meets periodically with recipients as appropriate to encourage positive action. In due course, the staff evaluates recipients' compliance and advises the Board concerning closure of the recommendations. The agency will report regularly to the public on the status of all of its safety recommendations.

An effective outreach program is a critical aspect of the CSB's work because the CSB has no enforcement powers and limited regulatory authority. Unless the lessons learned from investigated cases are effectively disseminated to appropriate parties, the reports themselves will prove of little value. Accordingly, the Board reaches beyond the recommendation recipients to seek the widest possible audience for its safety messages. Board Members and staff promote safety improvements using the CSB reports as teaching tools. Avenues include public forums, the news media, speaking engagements, the CSB website, symposia, and workshops. Board Members and staff also participate in technical symposia, safety committees, and other activities to promote safety.