IRRESPONSIBLE CARE

The Failure of the Chemical Industry to Protect the Public from Chemical Accidents

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Table of Contents

Executive Summary

Thousands of industrial chemical facilities put millions of Americans at risk of serious injury or death in the event of a chemical accident. The American Chemistry Council (ACC), the main lobbying organization that advocates on behalf of chemical companies, started the Responsible Care® program in 1988 to deflect criticism of the industry's environmental and public safety track record. Responsible Care® is a voluntary system of environmental, health and safety measures, including a Security Code that claims to make facilities less vulnerable to terrorist attacks. Unfortunately, the safety record of ACC member companies since the inception of Responsible Care® shows that these voluntary measures are not enough to protect communities from a chemical release in the event of an accident or terrorist attack.

This report analyzes accident data compiled by the National Response Center, the sole national point of contact for reporting oil and chemical discharges into the environment in the United States, for 1990 through 2003. We looked only at ACC member companies, who are required to adopt the Responsible Care® guidelines as a condition of their membership in the trade association. Key findings include:

- Since 1990, two years after the implementation of Responsible Care®, at least 25,188 accidents[a] have occurred at current ACC member companies' facilities.
- On average, 1,800 accidents occurred at ACC facilities each year, or five chemical accidents a day.
- Since 1990, two years after the Responsible Care® program was created, accidents have not declined at ACC member companies' facilities. In fact, the number of accidents increased in 2002, the year the chemical industry claimed to increase security and safety measures in the wake of September 11th, 2001.
- BP, Dow, and DuPont had the most accidents at their facilities since 1990. BP had at least 3,565 accidents at its facilities, Dow had 2,562, and DuPont had 2,115. These three companies were responsible for nearly one third (32.7%) of all the accidents at ACC member facilities since 1990.
- The top 25 ACC member companies were responsible for 21,064 accidents, or more than 83% of all ACC accidents.
- The states experiencing at least 500 accidents at ACC member facilities since 1990 are: Texas, Louisiana, Alaska, Ohio, South Carolina, Michigan, Pennsylvania, Kentucky, Tennessee, Georgia, New York, Indiana and New Jersey.

Many of these accidents occurred at ACC companies' facilities that are currently or have been under investigation by the U.S. Chemical Safety and Hazard Investigation Board:

- In March 2001, at the BP Amoco Polymers plant in Augusta, Georgia, a pressurized tank ruptured and ejected boiling plastic, killing three workers and causing a fire.
- At the Honeywell Baton Rouge plant in Louisiana, multiple chemical releases in July and August 2003 caused hundreds of evacuations, multiple hospitalizations and a fatality. Four plant workers were hospitalized and residents within a half-mile radius evacuated when chlorine

[a] The National Response Center database includes every accident and incident reported to the agency. These accidents range from an oil sheen to a major disaster that resulted in casualties. The NRC data provides the best overall picture of security at chemical and oil facilities. In addition, even a minor accident involving hazardous chemicals can result in serious injury.

gas was released from the chemical plant on July 20, 2003. Just nine days later, an accidental release of antimony pentachloride killed a worker. Finally, in early August, at this same plant in Baton Rouge, two plant workers were hospitalized after they were exposed to hydrofluoric acid.

The voluntary precautions of Responsible Care® are not enough to protect Americans from accidental chemical releases or the possibility of terrorist attacks. Instead, all chemical facilities should be required to meet mandatory federal standards for security. Most importantly, new federal standards must focus on reducing or eliminating the possibility of accidents and attacks through the use of safer chemicals and processes.

Background: The American Chemistry Council and Responsible Care®

The American Chemistry Council (ACC) is an industry lobbying organization that represents 140 companies of the $450 billion chemical industry. According to the ACC website, the mission of the Council is to use chemistry to benefit the public by creating new products and services in order to improve the quality of people's lives.[1] ACC commonly acts to protect the industry and its interests before Congress and the White House and works to strengthen public credibility of the industry.

The American Chemistry Council was originally created as the Chemical Manufacturers Association (CMA) in 1972 to act as an industry representative for manufacturers of chemicals. The Chemical Manufacturers Association changed its name to the American Chemistry Council in the summer of 2000 in order to "present a 'more positive reputation' for the chemical sector."[2] By changing its name, ACC aimed to shift its image from a trade association to a more community-friendly organization.

ACC has many large chemical companies as its members, including DuPont and Dow Chemical Company, as well as chemical divisions of oil companies such as British Petroleum and ExxonMobil. (See Appendix A for a full list of ACC member companies.)

The chemical industry has long struggled with a negative public image, due in large part to its involvement with the worst industrial disaster in history on December 3, 1984. As a result of water entering a chemical tank, 40 tons of methyl isocyanate gas at the Union Carbide pesticide plant in Bhopal, India escaped and formed a dense, ground-hugging cloud that spread throughout the city while the community slept. More than 500,000 residents were exposed, at least 2,000 died in the first three days, and more than 300,000 were injured. Since 1984, Dow Chemical Company, a current ACC member company, acquired Union Carbide, including its facility in India.

"We have said it all along that we are not asking the public to trust us. We are asking everyone to track us, monitor our performance and make suggestions that will help us improve." – Former CMA President Robert Roland, Chemical Week, July 1991

After this industrial disaster, the chemical industry struggled to repair its public image. John Johnstone, former chairman of the Chemical Manufacturers Association, said in the early 1990s that if the chemical industry did not do something, "we are going to end up in worse shape than the atomic industry."[3] As a result, CMA changed its name to the American Chemistry Council in the late 1990s and fully launched the Responsible Care® program in 1988.

Most recently, the American Chemistry Council has reported trouble in maintaining a strong list of member companies. Recent chemical companies that have withdrawn from the trade organization include Huntsman Chemical, Chevron Phillips Chemical, Lyondell Chemical, PolyOne, Noveon, and Velsicol Chemical.

The Responsible Care® Program and Security Code

To become a member of the American Chemistry Council, a company must implement what ACC calls the Responsible Care® Management System. This system is a code of conduct for member companies and requires them to develop a security plan for chemical safety, known as the Responsible Care® Security Code. The ACC management system incorporates both industry-identified managing procedures as well as any applicable government regulations.[4]

Responsible Care® Guidelines

ACC member companies follow these steps in implementing Responsible Care® at their chemical facilities:[5]

1. Prioritization and assessment of sites: Companies must prioritize the vulnerabilities of their facilities, in accordance with a four-tiered system developed by ACC;
2. Implementation of security measures: Companies must put in place physical security measures that are appropriate to the risks identified in step one;
3. Protecting information and cyber-security;
4. Training, drills and guidance: Companies must provide training for all employees, including "contractors, service providers, value chain partners, and others;"
5. Communications, dialogue and information exchange: Companies must balance communication on security matters to stakeholders, including surrounding communities, with the need to protect sensitive company information;
6. Response to security threats and incidents: Companies are required to respond to security threats and accidents;
7. Independent third-party verification: Facilities that have potential off-site consequences are required to seek an independent third-party to review site security;
8. Continuous improvement: Companies continue to plan, set goals, track performance, and take corrective action where deemed necessary;
9. Timing of the security code: The highest priority facilities were required to develop security plans by December 31, 2003. Security plans at all sites are required to be put in place by December 31, 2004, and the entire code is to be implemented by June 30, 2005.

Along with these steps, companies are required to report progress to the public and develop physical security measures.

Late in 2003, ACC expanded its work to include more facilities in its voluntary security program and approved a new category of Responsible Care® membership. Many industries and facilities that are non dues-paying members of the American Chemistry Council abide by the guidelines and mission statements of the Responsible Care® program, allowing them to use the brand of the security code and become Responsible Care® Partner companies.

Shortcomings of the Responsible Care® Program

The Responsible Care® program is the product of industry self-regulation on issues of chemical safety and environmental impact. As a voluntary industry endeavor, the chemical companies are not accountable to either the public or the government to provide complete safety. Moreover, even if the industry was able to ensure public accountability, the program

fails to address the single most important step chemical companies can take to make their facilities less vulnerable to accidents and attack—using inherently safer chemicals and technology.

Self Regulation

The Responsible Care® program is an industry self-regulated program; chemical companies are in charge of developing, implementing, and assessing the success of the program, with no formal accountability to the public. As such, the companies involved have an inherent incentive to develop standards that their facilities can meet rather than promulgate standards that may be best for public health and safety. Sal DePasquale, a former security manager for Georgia-Pacific Corporation, points out that if a company determines that its physical security standards are sufficient, for instance, Responsible Care® does not require that company implement stricter standards.[6]

Lack of Specific Standards and Deliverables

Currently, federal law does not require chemical companies to take specific security measures to protect the public from accidental releases or terrorist attacks; the public relies on ACC and individual companies to guarantee the safety of their facilities.[7] Although the Responsible Care® program provides guidelines for security measures, it does not require facilities to meet specific deliverables to ensure sufficient physical security measures are in place.

The combination of self-regulation and lack of specific standards has bored holes in security at facilities across the country. While investigating this lax security, several reporters and activists have been able to gain access to chemical storage tanks and other critical pieces of infrastructure. In November 2001, for example, a CBS investigative team "found mammoth holes in security," and gained access to several facilities, including ones owned by BP Chemical, an ACC member company.[8]

An important investigation by *Pittsburgh Tribune-Review* reporter Carl Prine showcased security gaps at other chemical facilities owned by ACC member companies. During research for an article, Prine gained access to a Nalco Chemical facility in Chicago, Illinois. The company had, in the past year, spent $1 million on physical security measures, but Prine was able to gain access through a gate that had been mistakenly left open. [9]

Weak Third Party Evaluations

Although Responsible Care® requires member companies to solicit third party evaluation of their security plans, ACC uses firefighters, policemen and other public servants to conduct these investigations. Although these first-responders may be capable of reviewing a security plan, they do not have the authority of a government agency. In addition, ACC does not require the companies to disclose who these third-party evaluators are and if they are truly independent of the company or facility. Furthermore, ACC has instructed third party certifiers to consider only physical security measures, and not to consider safer chemicals and processes that can remove the risk to surrounding communities.

Lack of Public Accountability

ACC calls for "tracking and public reporting" of the performance data from each company, requiring each company to post this information for the public without any evaluation or standard. The companies are not legally required to post accurate information to the public, nor are there any repercussions for posting misleading information. Although these new guidelines claim to seek a "means for the public to track individual company and industry performance," they do not ensure that the information disclosed to the public is accurate.[10]

As of January 2004, ACC required some of its members to post specific information on their websites, including: pounds of toxic releases, the number of accidents, any incidents recordable by the Occupational Safety and Health Administration, and whether ACC has certified their actions as part of the Responsible Care® management system.[11] Our analysis found varying degrees of compliance with this guideline, ranging from little or no information to complete compliance with the guideline.

Specifically:

- Dow has posted its 1999 "public report card" on its website, listing a description of the team of people that verified the company's security measures and its findings on the company's strengths and weaknesses. Dow does not include any information, however, on specific actions the company took to improve public safety nor does it mention the actual number of accidents or OSHA incidents involving employees or contractors.[12]
- BP provides the public with information about different types of chemical spills and accidents, but does not present information on the numbers of accidents, amount of chemicals released by the company, or people injured in the accidents.[13]
- DuPont posts the information required by ACC from 1987 to the present. The information shown on the website shows the percent change for areas that have improved over the years, but there is no analysis in areas where the situation has gotten worse, such as if the number of accidents and injuries has increased.[14]

In addition, Responsible Care® calls for the establishment of Community Advisory Panel (CAP) as one way to reach out to surrounding communities and provide a link between the community and the company, building "mutual respect and trust."[15]

However, these CAPs are often comprised of handpicked members that exclude community activists, and the company has the ability to disband the CAPs at its discretion. Moreover, the CAPs have no decision-making authority and no means to evaluate actual safety and environmental performance.

Failure to Require Inherently Safer Technology

One of the greatest oversights of the Responsible Care® program is that it does not require its facilities to use safer chemicals and processes to prevent the possibility of a devastating off-site consequence. By focusing solely on physical security standards, ACC misses the opportunity at many facilities to use alternative chemicals and processes that are less hazardous, removing the likelihood of a terrorist attack and mitigating public health consequences in the event of an accident.

Currently, the third party evaluations examine physical safety measures only and do not assess storage and use of chemicals at a facility.[16]

BP Amoco Polymers in Augusta, Georgia, March 2001

In March 2001, at the BP Amoco Polymers plant in Augusta, Georgia, a pressurized tank ruptured and ejected boiling plastic, killing three workers and starting a chemical fire.[17] The Chemical Security Board (CSB) blamed these deaths on the BP Amoco Polymers plant, concluding that the accident could have been avoided if the company had "been more vigilant about safety."[18] According to the CSB, "BP's researchers knew the molten plastic involved was susceptible to a gas-producing reaction at high temperatures, but the dangers to workers were not taken into account in the plant design or operating procedures."[19]

Findings: Accidents Happen Despite Responsible Care®

In total, since 1990, companies, employees and concerned citizens reported more than 416,000 accidents to the National Response Center (NRC).[b] The U.S. Coast Guard operates the National Response Center, developed under presidential order in 1973. The National Response Center is the only federal clearinghouse for receiving information about chemical accidents. This data is known to be incomplete and likely underestimates the number of accidents. The database developed by the National Response Center, however, presents the best overall picture of chemical accidents in the United States.

This report analyzes accident data compiled by the National Response Center from 1990 through 2003. We looked only at ACC member companies, who are required to adopt the Responsible Care® guidelines as a condition of their membership in the trade association. Unfortunately, the safety record of ACC member companies since the inception of Responsible Care® shows that these voluntary measures are not enough to protect communities from a chemical release in the event of an accident or terrorist attack.

Specifically:

- Since 1990, two years after the implementation of Responsible Care®, at least 25,188 accidents have occurred at current ACC member companies' facilities (Table 1).

Table 1. Number of Accidents at Facilities Owned by ACC Member Companies, 1990-2003

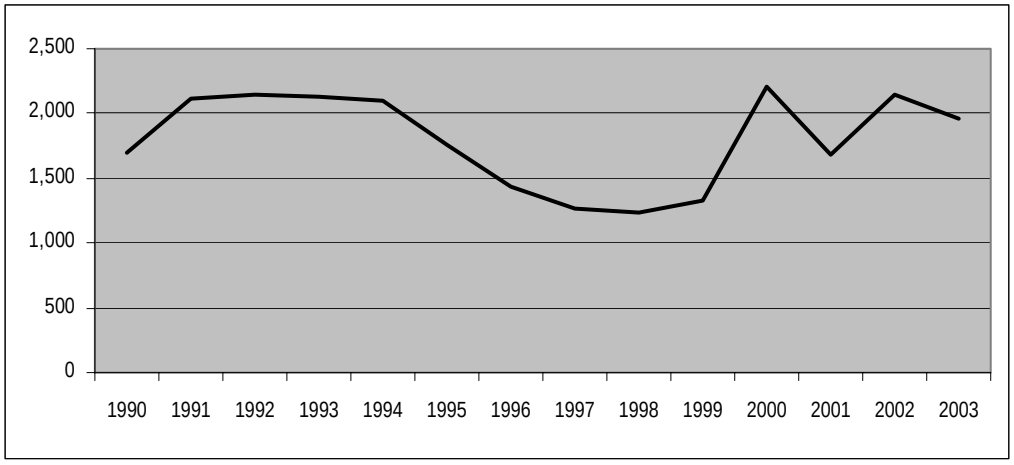
Year	Number of Accidents
1990	1,705
1991	2,107
1992	2,141
1993	2,137
1994	2,102
1995	1,752
1996	1,438
1997	1,265
1998	1,232
1999	1,333
2000	2,207
2001	1,675
2002	2,138
2003	1,956
Total	**25,188**

- On average, 1,800 accidents occurred at ACC facilities each year, or five chemical accidents a day.

- Since 1990, two years after the Responsible Care® program was created, accidents have not declined at ACC member companies' facilities. In fact, the number of accidents increased in 2002, the year the chemical industry claimed to increase security and safety measures in the wake of September 11th, 2001 (Figure A).

[b] The National Response Center database includes every accident and incident reported to the agency. These accidents range from an oil sheen to a major disaster that resulted in casualties. The NRC data provides the best overall picture of security at chemical and oil facilities. In addition, even a minor accident involving hazardous chemicals can result in serious injury.

Figure A. Number of Accidents at Facilities Owned by ACC Member Companies, 1990-2003



BP, Dow, and DuPont were responsible for the most chemical accidents, totaling nearly one third (32.7%) of all the accidents at ACC member facilities since 1990. Twenty-five (25) ACC companies were responsible for 21,064 accidents, or more than 83% of all the ACC accidents (Table 2). Refer to Appendix B for a list of all ACC member companies and their reported accidents between 1990 and 2003.

The states experiencing at least 500 accidents at ACC member facilities since 1990 are: Texas, Louisiana, Alaska, Ohio, South Carolina, Michigan, Pennsylvania, Kentucky, Tennessee, Georgia, New York, Indiana and New Jersey (Table 3). The accidents in Texas and Louisiana alone accounted for more than 49% of accidents at ACC member facilities across the country. Refer to Appendix C for a full list of states.

Table 2. 25 ACC Member Companies Responsible for the Most Chemical Accidents, 1990-2003

Rank	Responsible Company	# of Accidents
1	BP	3565
2	Dow	2562
3	DuPont	2115
4	ExxonMobil Chemical Company	1133
5	Celanese	1115
6	Occidental Chemical Corp.	1097
7	Vulcan Chemical Corp.	866
8	Kerr-McGee Chemical	806
9	Rohm and Haas	785
10	BASF Corporation	758
11	Shell Chemicals	725
12	PPG Industries	665
13	Eastman Chemical Company	633
14	Monsanto	534
15	Honeywell	447
16	Air Products and Chemicals, Inc.	386
17	Georgia Gulf Corp.	377
18	Kemira Chemicals	347
19	Olin Corporation	338
20	Eli Lilly & Co.	317
21	Eastman Kodak Company	314
22	Cytec Industries Inc.	301
23	ATOFINA Chemicals, Inc.	297
24	3M	293
25	Meadwestvaco Corporation, Specialty Chemicals	288
	Total	**21,064**

Table 3. 20 States with Most Accidents at Facilities Owned by ACC Member Companies, 1990-2003

Rank	State	# of Accidents
1	Texas	7072
2	Louisiana	5375
3	Alaska	1041
4	Ohio	805
5	South Carolina	746
6	Michigan	698
7	Pennsylvania	690
8	Kentucky	686
9	Tennessee	563
10	New York	557

Rank	State	# of Accidents
10	Georgia	557
12	Indiana	506
13	New Jersey	501
14	Alabama	479
15	Kansas	470
16	Florida	395
17	Illinois	388
18	West Virginia	383
19	Arkansas	353
20	California	346

Honeywell Facility in Baton Rouge, Louisiana, July and August 2003

At the Honeywell Baton Rouge plant in Louisiana, multiple releases in the months of July and August 2003 caused hundreds of evacuations, multiple hospitalizations and one fatality.

In the first accident on July 20, 2003, eight plant workers were hospitalized and the 600 residents living within a mile radius of the plant were evacuated following a release of chlorine gas.[20] Citizens were notified over loudspeakers to remain in their homes at 3:30 am and were assured at 7am that they were safe to open their windows and leave their homes without risk. Despite assurances, 17 citizens were hospitalized and traces of numerous hazardous chemicals were detected in the air, according to Anne Rolfes, director of the Louisiana Bucket Brigade, a nonprofit citizens group.

Just nine days later, one worker died from chemical exposure after filling a storage container with antimony pentachloride. This is a corrosive chemical that burns the skin, irritates the nose, mouth, throat and lungs, and causes headaches and nausea.

Finally, in early August, at this same plant in Baton Rouge, two plant workers were hospitalized after three pounds of hydrofluoric acid spilled, causing serious burns on one employee and respiratory problems in the other.[21] According to a representative from the fire department, the two workers were attempting to repair one of the hydrofluoric lines when the chemical sprayed on the men.[22]

Current Policies Leave Gaps in Security

A few state and federal policies address the problem of accidents at chemical facilities. Most of these policies, however, take a backwards view of chemical accidents and deal with responses to accidents, such as attempting to mitigate the effects of a chemical release. Few policies take the proactive approach and require that chemical facilities look to prevent chemical accidents instead of simply reduce the damage once an accident occurs.

The Emergency Planning and Community Right-to-Know Act

The American Chemistry Council (then the Chemical Manufacturers Association) was not the only group to respond to the devastating accident in Bhopal. Congress passed the Emergency Planning and Community Right-to-Know Act (EPCRA) in 1986 due to grassroots pressure to prepare Americans for the possibility of a similar disaster. EPCRA requires chemical companies to submit information to local first responders – such as fire fighters and police – about what chemicals they store and use on site. In addition, EPCRA created Local Emergency Planning Committees, or LEPCs, which were set up to provide public planning for emergencies and to improve communication between local chemical facilities and the surrounding communities. A 2001 survey of LEPCs, however, found that "with a few exceptions, they do not believe they are positioned to effectively encourage facilities to reduce chemical hazards."[23]

Public Right-to-Know Laws

One of the most important tools in protecting communities from accidents involving hazardous chemicals is the right of the public to know what chemicals are used, released, and stored in their communities. Existing laws, at both the federal and state levels, have dramatically reduced the quantity of chemicals released and used. For example, the federal Toxic Release Inventory program, which requires several industry sectors to report the toxic chemicals they release into our air, water, and onto our land, reduced releases of carcinogenic chemicals by 41% between 1995 and 2000.[24]

In addition, a Massachusetts state law requires companies to disclose the chemicals used by their facilities, including the amounts on site, transported in products, released to the environment, and generated as waste. Companies also are required to produce toxics use reduction plans. As a result, between 1990 and 1999, facilities reduced their use of toxic chemicals by 41%, while at the same time production increased by 52% and companies saved $15 million.[25]

Current right-to-know laws, however, do not include the public's right-to-know about safer chemicals and processes facilities could be using to prevent accidents at their facilities.

The Clean Air Act and Risk Management Program

In 1990, Congress passed legislation to establish the Risk Management Program, which is EPA's chief accident prevention program. These amendments to the Clean Air Act defined 140 toxic and flammable chemicals that represent a serious threat to human health and the environment and identified 15,000 chemical facilities that use or store these chemicals for their production uses. These facilities are required to develop Risk Management Plans (RMPs) and report them to U.S. EPA.[26] RMPs include a hazard assessment that details the potential effects of an accidental release; an evaluation of worst-case and alternative accidental releases; information

on safety precautions, maintenance, and monitoring; and procedures for informing the public and response agencies should an accident occur.[27]

In addition, in 1999, Congress limited public access to RMPs to a few public reading rooms. EPA further weakened the program after September 11th, 2001, by removing information about the prevention program and emergency response program from the Internet. EPA placed the summary information previously available on the Internet in EPA reading rooms.

State and Local Laws Move Towards Accident Prevention

A few state and local laws do move beyond responding to accidents and instead look at preventing accidents. Contra Costa County in California requires that chemical facilities integrate safer chemicals and processes when they implement their Risk Management Plans.[28]

In addition, New Jersey's Toxic Catastrophe Prevention Act (TCPA), which was passed in response the Bhopal accident, requires chemical owners and operators to include risk "abatement" in their plans to reduce their risk to surrounding communities. Under the law, the state may order a facility to implement an "extraordinarily hazardous substance risk reduction plan," which could include requiring the company to switch to safer chemicals or processes.[29] TCPA has helped reduce the amount of chemicals used and stored onsite, thereby reducing the risk of an accidental chemical release.

Recent Regulatory Action

Since September 11th, 2001, the federal government, particularly the White House, has been under pressure to address the security gap at chemical facilities. Under the Clean Air Act, EPA does have the authority to address security at chemical facilities; however, the agency has been concerned about the "litigation risk" involved, despite its past experience in regulating chemical facilities.[30] In early 2003, EPA visited 30 facilities that agreed to meet. The nature and results of these visits are not known.

In February 2003, President Bush assigned responsibility for chemical facility security to the Department of Homeland Security (DHS). Since its inception in 2003, DHS has "placed chemical security on the top priority list for physical infrastructure protection;" deployed National Guard members to some chemical facilities; put together a risk assessment to identify the highest risk facilities; sent DHS security specialists to an unknown number of facilities; and completed vulnerability assessments at an unknown number of sites.[31]

Policy Recommendations

The most important step chemical companies can take to reduce the risk posed to surrounding communities is to switch to less toxic chemicals and processes. The public also has a right to know about the chemicals used and stored in communities, as well as how companies could make neighboring facilities inherently safer.

Require Safer Technology to Prevent Accidents

Both the ACC's Responsible Care® guidelines for security, as well as federal policies and actions, have focused on reducing the potential harm from or severity of a chemical accident. None of these programs or policies focuses on preventing the possibility of a chemical accident. Companies should be required to at least consider, and implement where feasible, safer chemicals and processes that reduce or eliminate the possibility of an accident.

A policy study by Nicholas Ashford from the Massachusetts Institute of Technology recommended that EPA require chemical producers and users to submit a "technology options analysis," or an analysis of safer chemicals and processes that could be used in their business.[32]

Many individual facilities have substituted the chemicals or processes they use on site:

- In Washington, DC, the Blue Plains Sewage Treatment Plant switched from volatile chlorine gas, which could have blanketed the nation's capital in a toxic cloud, to sodium hypochlorite bleach, which has almost no potential for an off-site impact.[33] In the wake of September 11th, 2001, the facility completed the switch in a matter of weeks. The expected cost to consumers will be 25 to 50 cents per customer per year.
- In Cheshire, Ohio, American Electric Power selected a urea-based pollution control system rather than one involving large-scale storage of ammonia that would have endangered the surrounding community.[34]
- In Wichita, Kansas, the Wichita Water and Sewer Authority's sewage treatment plant switched from using chlorine gas to ultra violet light in its disinfection processes. The plant expects to save money in the long run as a result of the change, as there is about a 20% anticipated cost savings in energy costs versus chemical costs.[35]
- In New Jersey, more than 500 water treatment plants have switched away from or are below threshold volumes of chlorine gas as a result of the state's Toxic Catastrophe Prevention Act.[36]
- In 2003 in Wilmington, California, the Valero Refinery switched from hydrofluoric acid, which when released forms a toxic cloud that hovers over surrounding communities, to modified hydrofluoric acid, which is less hazardous. This change was largely due to decades of community pressure after a devastating accident at a near-by refinery in the area.[37]

Protect and Expand the Public's Right-to-Know

Public disclosure provides one of the best incentives for industry to reduce its use and release of toxic chemicals. The Toxic Release Inventory (TRI) program is one of the most successful public right-to-know laws in terms of reducing chemicals released into our air and water.

Although the Toxic Release Inventory has been one of the most successful toxic

release reduction programs, EPA could expand and improve it by:

- Increasing the number of chemicals currently in the program;
- Releasing the data to the public in a more timely manner; currently, the public must wait more than a year to receive data about toxics released in communities;
- Increasing the number of industries that are required to report their toxic releases; currently, many facilities that release large amounts of toxic chemicals, such as commercial dry cleaners, are exempt from reporting;
- Requiring facilities to publicly disclose the amount of chemicals they store on-site. Although some facilities are required to report the chemicals they store on-site through the RMP program, facilities would have greater incentive to reduce chemicals stored on-site if this information were readily available to the public.

Beyond the TRI program, EPA could improve the public's right-to-know by requiring companies to develop publicly available toxics use reduction plans. This would encourage companies to substitute the chemicals and processes they use for those that are inherently safer.

Currently, the government does not require chemical companies to even consider substituting safer chemicals and processes as a way to protect the public. In addition, if a facility could substitute a safer chemical for a more hazardous one, the public has no way of knowing if or why the company dismissed that option.

The public should have access to complete and accurate data. Although chemical facilities are required to report major accidents to the EPA under the Risk Management Program, the general accident data collected by the National Response Center is incomplete. Federal agencies should improve the reporting of chemical accidents to the National Response Center or develop an alternative mechanism to house this information.

Enact Federal Standards

The current ACC guidelines and the federal policies surrounding chemical accidents are clearly inadequate to protect the public and workers from chemical accidents. Federal standards are necessary to ensure that all companies and facilities are adequately working to protect the public and reduce the probability that an accident will occur.

The chemical industry often argues that requiring diverse and complex industries to reduce their possibility of a chemical accident is unrealistic and difficult to implement. Federal standards that require diverse facilities and processes to reduce their risk, however, could be flexible to accommodate such a variety of industry needs. Simply requiring facilities to publicly disclose viable options to their current chemical use and processes holds those facilities and companies accountable and greatly increases the probability that companies will prevent accidents through the use of safer chemicals and processes.

Methodology

We obtained the current list of ACC member companies subscribing to the Responsible Care® guidelines from the ACC website, www.americanchemistry.com.

We obtained data on chemical accidents for 1990 through 2003 from the National Response Center, http://www.nrc.uscg.mil/. This data set includes the identification number of each incident reported to the National Response Center, the name of the responsible company, state location, zip code, chemical released, amount released, number of people injured, hospitalized, evacuated and the number of fatalities.

If only one specific company within a larger corporation is affiliated with Responsible Care®--for example, Shell Chemical is a Responsible Care® member, but the parent company, Shell, is not—we attempted to include accidents occurring only at facilities owned by the Responsible Care® member.

For companies with subsidiaries, we attributed all accidents to the parent company.

Appendix A. American Chemistry Council Member Companies

3M
Air Liquide America Corporation
Air Products and Chemicals, Inc.
Akzo Nobel Chemicals, Inc.
Albemarle Corporation
Anderson Development Company
Arch Chemicals Inc.
Ashland Inc. - Distribution and Specialty Chemical Companies
ASHTA Chemicals Inc.
ATOFINA Chemicals, Inc.
Avecia Inc.
Avery Dennison Chemical Division
Baker Petrolite Corporation
BASF Corporation
Bassell
Bayer Corporation
BOC Gases, A Division of BOC Group
BP
Calgon Carbon Corporation
Cambrex Corporation
Carus Chemical Company, Division of Carus Corporation
Celanese
CHEMCENTRAL Corporation
Chemical Products Corporation
Chevron Oronite Company
Church & Dwight Co., Inc.
Ciba Specialty Chemicals Corporation
Cognis Corporation
Cooper Natural Resources
Croda Inc.
Crompton Corporation
Cytec Industries Inc.
Daikin America, Inc.
Dakota Gasification Company
DanChem Technologies Inc.
Degussa Corporation
Dixie Chemical Company, Inc.
Dorf Ketal Chemicals LLC
Dover Chemical Corporation
Dow
Dow Corning Corporation
DSM USA
DuPont
Durez Corporation
Eaglebrook, Inc.
Eastman Chemical Company
Eastman Kodak Company
El Dorado Chemical Company
Elementis Specialties
Eli Lilly and Company
Eliokem, Inc.
EMD CHEMICALS
Engelhard Corporation
ERCO Worldwide, Inc.
Ethyl Corporation
ExxonMobil Chemical Company
Ferro Corporation
FMC Corporation
Gantrade Corporation
Gen Tek Performance Products
Georgia Gulf Corporation
Great Lakes Chemical Corporation
Halocarbon Products Corporation
Harborchem
Honeywell
IMC Chemicals Inc.
Infineum USA
International Specialty Products
Jones-Hamilton Company
KAO Specialties Americas LLC
Kaufman Holdings Corporation
Kemira Chemicals, Inc.
Kerr-McGee Chemical LLC
KMG Chemicals, Inc.
Kuehne Chemical Company, Inc.
Lonza Group Ltd.
Lubrizol Corporation
Meadwestvaco Corporation, Specialty

Chemicals Division
Merck & Co.
Merichem Company
Merisol USA LLC
Methanex Corporation
Millennium Cell
Millennium Chemicals Inc.
Milliken and Company
Mitsubishi Chemical America, Inc.
Mitsui & Co. (USA), Inc.
Monsanto Company
Nalco
National Starch and Chemical Company
Nexen Chemicals
NOVA Chemicals Corporation
Occidental Chemical Corporation
Octel-Starreon LLC
Olin Corporation
OM Group, Inc.
Peak Chemical, L.L.C.
Perstorp Polyols, Inc.
PPG Industries, Inc.
PQ Corporation
Praxair, Inc.
Procter & Gamble, Chemicals Division
PVS Chemicals, Inc.
R.T. Vanderbilt Company, Inc.
Reilly Industries, Inc.
Rhodia Inc.
Roche Colorado Corporation
Rohm and Haas Company, Inc.
RohMax USA
Rutherford Chemicals LLC
SABIC Americas
Sartomer Company, Inc.
Sasol North America, Inc.
Schenectady International, Inc. (Chemical Division)
Shell Chemical LP
Sika Corporation
Silbond Corporation
SNF Holding Company
Solutia Inc.
Solvay America, Inc.
Stepan Company
Sud-Chemie Inc.
Sumitomo Chemical America, Inc.
Sunoco, Inc.
Surface Specialties UCB
Texas Brine Company, LLC
The C.P. Hall Company
The Shepherd Chemical Company
Tomah3 Products, Inc.
Troy Corporation
Uniqema
UOP
Vertex Chemical Corporation
Vulcan Chemicals, A Division of Vulcan Materials Company
W.R. Grace & Co.
Wacker Chemical Holding Corporation

Appendix B. Number of Accidents Involving ACC Member Companies, by Company, 1990-2003

Responsible Company	# of Accidents
BP	3,565
Dow	2,562
DuPont	2,115
ExxonMobil Chemical Company	1,133
Celanese	1,115
Occidental Chemical Corp.	1,097
Vulcan Chemical Corp.	866
Kerr-McGee Chemical	806
Rohm and Haas	785
BASF Corporation	758
Shell Chemicals	725
PPG Industries	665
Eastman Chemical Company	633
Monsanto	534
Honeywell	447
Air Products and Chemicals, Inc.	386
Georgia Gulf Corp.	377
Kemira Chemicals	347
Olin Corporation	338
Eli Lilly & Co.	317
Eastman Kodak Company	314
Cytec Industries Inc.	301
ATOFINA Chemicals, Inc.	297
3M	293
Meadwestvaco Corporation, Specialty Chemicals	288
Sunoco	228
Ethyl Corporation	208
Bayer Corporation	192
Merck & Co.	173
Albemarle Corporation	165
Ciba Specialty Chemicals Corporation	163
Akzo Nobel Chemicals, Inc.	161
IMC Chemicals	155
El Dorado Chemical Co.	144
Reilly Industries	137
Dow Corning Corporation	135
FMC	135
Proctor & Gamble	119
Great Lakes Chemical Corporation	115
Crompton Corporation	112
Dakota Gasification Company	109
Solutia	99

Responsible Company	# of Accidents
Lubrizol Corporation	88
Praxair	81
W.R. Grace & Co.	74
Rhodia	72
Arch Chemicals, Inc.	71
Solvay America	70
International Specialty Products	61
Dixie Chemical Company, Inc.	61
Degussa Corporation	55
Millennium Chemicals	54
DSM USA	54
Stepan Company	51
Engelhard Corporation	48
Air Liquide America Corporation	45
Sasol	41
Nalco	41
PVS Chemicals	36
Nova Chemicals Corporation	35
National Starch and Chemical Company	35
BOC Gases, A Division of BOC Group	30
Eliokem	26
Merisol	25
Ferro Corporation	25
Ashland Inc.	21
Cognis Corporation	20
Solutia/Akzo Nobel	20
Lonza	18
UOP	17
Schenectady International	15
Calgon Carbon Corporation	15
Baker Petrolite Corporation	15
Vertex Chemical Corp.	15
Eaglebrook Inc.	14
ASHTA Chemicals Inc.	13
Merichem	13
Avery Dennison Chemical Division	12
Nexen Inc.	11
Tomah Products	10
Daikin America, Inc.	10
Chemcentral Corporation	10
KAO Specialties	10
R.T. Vanderbilt Company	10
Milliken & Co.	9
Sartomer	9
Mitsubishi Chemical	9
PQ Corporation	8

Responsible Company	# of Accidents
Carus Chemical Company	8
Kaufman Holdings	6
Croda Inc.	6
ELEMENTIS	6
Mitsui	5
FMC/Solutia	5
Anderson Development Company	5
Dover Chemical Corporation	4
Uniqema	4
Chevron Oronite Company	4
Halocarbon Products Corp.	3
OM Group	3
Jones-Hamilton Co.	3
Church & Dwight Co., Inc.	3
DanChem Technologies Inc.	3
Surface Specialties UCB	3
Cooper Natural Resources	2
Kuehne Chemical Co.	2
Infineum	2
EMD Chemicals	2
Sabic	2
Perstorp Polyols Inc.	2
Avecia Inc.	1
KMG Chemicals	1
Sika Corporation	1
Peak Chemical	1
Methanex Corporation	1
Cambrex Corporation	1
Wacker Chemical Corp.	1
Roche Colorado Corp.	1

Appendix C. Number of Chemical Accidents Involving ACC Member Companies, by State, 1990-2003

Rank	State	# of Accidents
1	Texas	7072
2	Louisiana	5375
3	Alaska	1041
4	Ohio	805
5	South Carolina	746
6	Michigan	698
7	Pennsylvania	690
8	Kentucky	686
9	Tennessee	563
10	New York	557
10	Georgia	557
12	Indiana	506
13	New Jersey	501
14	Alabama	479
15	Kansas	470
16	Florida	395
17	Illinois	388
18	West Virginia	383
19	Arkansas	353
20	California	346
21	Virginia	342
22	North Carolina	321
23	Minnesota	247
24	Mississippi	204
25	North Dakota	133
26	Missouri	131
27	Delaware	117
28	Wyoming	106
29	Iowa	95
30	Maryland	86
31	Massachusetts	85
32	Washington	75
33	Oklahoma	73
34	Idaho	68
35	Puerto Rico	52
36	Wisconsin	46
37	Maine	39
38	Utah	37
39	Rhode Island	33
40	Connecticut	29
41	Colorado	28
42	Oregon	20
42	Nebraska	20
44	Arizona	14
45	Nevada	7
46	New Mexico	5
46	South Dakota	5
48	District of Columbia	4
49	Vermont	3
49	New Hampshire	3
51	Montana	2
52	Hawaii	1
52	American Samoa	1
	No State Listed	145
	Total	**25,188**

End Notes

[1] American Chemistry Council, www.americanchemistry.com, 17 February 2004.
[2] Gary Taylor, "US CMA name change to reflect more positive image for chem," *Chemical News & Intelligence,* June 15, 2000.
[3] John Holusha, "Chemical Makers Identify a New Hazard: Their Image," *New York Times,* 12 August 1991.
[4] John Holusha, "Chemical Makers Identify a New Hazard: Their Image," *New York Times,* 12 August 1991.
[5] Martin Durbin, ACC Security Team Leader, "Testimony before the House Committee on Government Reform Subcommittee on National Security, Emerging Threats, and International Relations," 23 February 2004.
[6] Sal DePasquale, e-mail correspondence with Julia Bauler, March 2004.
[7] General Accounting Office, *Federal Action Needed to Address Security Challenges at Chemical Facilities.* Statement of John B. Stephenson, Director Natural Resources and Environment, GAO-04-482T, February 2004.
[8] "U.S. Plants: Open to Terrorists," www.cbsnews.com, 14 November 2003.
[9] Carl Prine, "Chemicals Pose Risks Nationwide," *Pittsburgh Tribune-Review*, 5 May 2002.
[10] American Chemistry Council, www.americanchemistry.com, 17 February 2004.
[11] American Chemistry Council, "Performance Metric," www.americanchemistry.com, 27 January 2004.
[12] Dow Chemical Company, "Environment, Health and Safety," www.dow.com, 23 March 2004.
[13] British Petroleum, "Environment and Society," www.bp.com, 23 March 2004.
[14] Dupont, "Global Progress Report," www.dupont.com, 23 March 2004.
[15] American Chemistry Council, www.americanchemistry.com, 22 March 2004.
[16] Paul Orum, "Spills and Emergencies," www.crtk.org, 26 February 2004.
[17] Chemical Security Board, "BP Amoco Thermal Decomposition Incident," www.csb.gov, 26 February 2004.
[18] Johnny Edwards, "Fatal explosion at plant preventable, agency says." *The Augusta Chronicl*e. 24 May 2002.
[19] Johnny Edwards, "Fatal explosion at plant preventable, agency says." *The Augusta Chronicl*e. 24 May 2002.
[20] Ned Randolf, "Employee dies after second leak at Honeywell." *The Advocat*e. 31 July 2003.
[21] Ned Randolf, "Acid spill at Honeywell plant hurts 2 workers." *The Advocate*. 14 August 2003.
[22] Ned Randolf, "Acid spill at Honeywell plant hurts 2 workers." *The Advocate*. 14 August 2003.
[23] National Institute for Chemical Studies, "Local Emergency Planning Committees and Risk Management Plans: Encouraging Hazard Reduction," prepared for U.S. EPA, Chemical Emergency Preparedness and Prevention Office (#CX824095), June 2001.
[24] Tony Dutzik et al, *Toxic Releases and Health: A Review of Pollution Data and Current Knowledge on the Health Effects of Toxic Chemicals,* U.S. Public Interest Research Group Education Fund, January 2003.
[25] Toxics Use Reduction Institute, Lowell, MA. See www.turi.org/turadata/Success/ResultsToDate.html
[26] General Accounting Office, *Homeland Security: Voluntary Initiatives Are Under Way at Chemical Facilities, but the Extent of Security Preparedness is Unknown*, GAO-03-439, March 2003.
[27] U.S. EPA, Chemical Emergency Preparedness and Prevention, RMP Overview, http://yosemite.epa.gov/oswer/ceppoweb.nsf/content/RMPoverview.htm.
[28] General Accounting Office, *Homeland Security: Voluntary Initiatives Are Under Way at Chemical Facilities, but the Extent of Security Preparedness is Unknown*, GAO-03-439, March 2003.
[29] Toxic Catastrophe Prevention Act, N.J.S.A. 13:1K-19 et seq.
[30] General Accounting Office, *Homeland Security: Voluntary Initiatives Are Under Way at Chemical Facilities, but the Extent of Security Preparedness is Unknown*, GAO-03-439, March 2003.
[31] Robert Liscouski, Department of Homeland Security, Testimony before the House Committee on Government Reform Subcommittee on National Security, Emerging Threats, and International Relations, 23 February 2003.

[32] N.A. Ashford, et al, *The Encouragement of Technological Change for Preventing Chemical Accidents: Moving Firms from Secondary Prevention and Mitigation to Primary Prevention.* Cambridge, Massachusetts: Center for Technology, Policy, and Industrial Development, Massachusetts Institute of Technology, Boston, 1993.
[33] Eric Pianin, "Toxic Chemicals' Security Worries Officials; Widespread Use of Industrial Materials Makes Them Potential Target of Terrorists," *Washington Post*, 12 November 2001.
[34] American Electric Power, press release, December 18, 2000.
[35] Communication between Paul Orum, Working Group on Community Right-to-Know, and Becky Gagnon, Wichita Water and Sewer Authority, September 23, 2002.
[36] Communication between Paul Orum, Working Group on Community Right-to-Know, and Reggie Baldini, New Jersey Department of Environmental Protection, September 19, 2001.
[37] South Coast Air Quality Management District, "Highly Toxic Chemical to be Phased Out at Valero Refinery," February 7, 2003, available at www.aqmd.gov/news1/hfvalero.htm.