

# Report for Congress

Received through the CRS Web

## Chemical Plant Security

Updated January 23, 2003

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# Chemical Plant Security

## Summary

Chemical facilities might be vulnerable to direct attacks by terrorists or covert use of business contacts, facilities, and materials to gain access to potentially dangerous chemicals. Because few terrorist attacks have been attempted on U.S. chemical facilities, the estimated risk of death and injury in the near future is low, relative to the likelihood of accidents or attacks on other targets using conventional weapons. For any individual chemical plant, the risk is very small, but risks may be increasing, consequences for human health and the environment could be severe, and available evidence indicates that many facilities may lack adequate safeguards.

The federal Emergency Planning and Community Right-to-Know Act and Clean Air Act require planning to protect the general public from accidental releases of hazardous chemicals from chemical facilities. The Acts mandate disclosure of chemical hazards in order to stimulate public interest in planning. Since neither law addresses releases due to terrorism, EPA authority to regulate in this area is unclear.

Congress might rely on existing mechanisms in the public and private sectors to evaluate and improve chemical site security, while waiting for better information about the potential harm from terrorist attacks on chemical facilities. Oversight of EPA implementation of existing planning requirements also is an option. Or, Congress might enact legislation to reduce risks in several ways. The most common approach is to “harden” defenses, for example by increasing security patrols. Hardening tactics may be adapted to security needs, layered to deepen protection, and often are relatively low cost. A potential disadvantage is that even the most effective security measures might be defeated by a determined, skilled terrorist organization. Risk also might be reduced by use of safer chemicals, procedures, and processes. This strategy might reduce harm from accidents as well as attacks, but may involve higher costs. Restricting terrorists’ access to information might be the least costly option, but would limit public access and reduce accountability of facility owners.

Policy makers face at least three key issues: the effect of public disclosure; the relative importance of diverse risks; and who should be responsible for achieving results. Various legislative proposals in the 107<sup>th</sup> Congress (S. 1456, S. 1602/H.R. 5300, S. 2452, S. 2579, H.R. 2435, and H.R. 4698) would have required owners to reduce the hazards at chemical facilities and restricted access to hazardous chemicals or to information about chemical facilities. Public Law 107-296, establishing the Department of Homeland Security (DHS), does not address chemical plant security directly. However, if facilities are part of the “critical infrastructure” (e.g., water utilities), the law requires DHS to analyze vulnerabilities and recommend ways to enhance site security. Information voluntarily submitted to DHS about facility vulnerability is exempt from public disclosure requirements of the Freedom of Information Act and state or local laws. In the 108<sup>th</sup> Congress, S. 6 and S. 157 would direct EPA to oversee chemical facilities, in consultation with DHS. They would require high priority facilities to identify hazards, assess vulnerabilities, and develop and implement plans to reduce the consequences of terrorist attacks.

This report will be updated as warranted by congressional activity.

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# Chemical Plant Security

## Introduction

The potential harm to public health and the environment from a sudden release of hazardous chemicals has long concerned the U.S. Congress. The sudden, accidental release in December 1984 of methyl isocyanate in an industrial accident at the Union Carbide plant in Bhopal, India, and the attendant loss of thousands of lives and widespread injuries spurred legislative proposals to reduce the risk of chemical accidents in the United States. For example, federal environmental laws were enacted in 1986 and 1990 to mitigate and reduce the risk of accidental releases of hazardous chemicals from manufacturing facilities, processing plants, and storage tanks. (These laws are discussed below.) The Hazardous Materials Transportation Act of 1975 was passed to protect the public and environment in the event of an accident during transportation of chemicals. Other federal laws coordinate preparedness planning and response to significant chemical spills (e.g., the Comprehensive Environmental Response, Compensation, and Liability Act). In the aftermath of September 11, 2001, however, Congress is re-examining existing federal laws, including laws related to hazardous chemicals in U.S. commerce, to determine whether they are adequate to prevent, deter, or mitigate the effects of terrorist acts.<sup>1</sup>

This report reviews requirements that aim to reduce risks to the general public of exposure to hazardous chemicals as a result of terrorist acts at U.S. chemical production, processing, or storage facilities.<sup>2</sup> It considers the likelihood and severity of harm that might result from terrorist attacks on chemical facilities, as well as from illicit use of such facilities to gain access to hazardous chemicals (or to precursor chemicals that can be used to produce hazardous chemicals). Federal requirements for contingency planning and responding to chemical emergencies after they occur are not the focus of this report.<sup>3</sup> In addition, it does not consider hazardous materials transport (or storage incidental to transport).<sup>4</sup>

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<sup>1</sup> There is no universally accepted definition of “terrorism.” Various definitions are discussed in the CRS Issue Brief IB95112, *Terrorism, the Future, and U.S. Foreign Policy.*”

<sup>2</sup> For information on the security of other types of facilities, see the CRS Terrorism Briefing Book, especially the section entitled Prevention: Security Enhancements. [<http://www.congress.gov/brbk/html/ebter114.html>]

<sup>3</sup> Instead, see the CRS Terrorism Briefing Book, the Domestic Emergency Management section, especially the pages “Emergency Preparedness,” “FEMA Role and Responsibility,” “Government Response Coordination,” and “Environmental Authorities.”

<sup>4</sup> Instead, see CRS report RS21050, *Hazardous Materials Transportation: Vulnerability to Terrorists, Federal Activities, and Options to Reduce Risks.*

The report first describes the range of terrorist acts that might threaten chemical facilities and summarizes publicly available information relevant to risks: recent trends in terrorist activity, including chemical use by terrorists; expert estimates of the harm that might be inflicted through chemical terrorism; and assessments of the vulnerability of chemical facilities. The next section of the report provides background information on existing federal mandates and incentives for reducing risks of accidental releases from chemical facilities. The remainder of the report summarizes recent administrative and private sector initiatives to improve chemical site security; analyzes policy options and key issues; and describes legislation in the 108<sup>th</sup> Congress.

## Risks of Terrorism at Chemical Facilities

**Nature of Hazards.** Potential terrorist acts against chemical facilities might be classified roughly into two categories: direct attacks on facilities or chemicals on site, or covert use of business contacts, facilities, and materials (e.g., letterhead, telephones, computers, etc.) to gain access to materials. In either case, terrorists may be employees (saboteurs) or outsiders, acting alone or in collaboration with others. In the case of a direct attack, traditional or nontraditional weapons may be employed, including explosives, incendiary devices, firearms, airplanes, computer programs, or weapons of mass destruction (nuclear, radiological, chemical, or biological).

In obtaining chemicals, a terrorist's intent may be their use as weapons or to make weapons, including but not limited to explosives, incendiaries, poisons, and caustics. Access to chemicals might be gained by physically entering a facility and stealing supplies, or by using legitimate or fraudulent credentials (e.g., company stationary, order forms, computers, telephones or other resources) to order, receive, or distribute chemicals.

**Recent Trends in Overall Terrorist Activities.** According to May 2001 testimony by the Director of the Federal Bureau of Investigation (FBI) to the U.S. Senate, the total number of known or suspected acts of terrorism perpetrated in the United States increased from 2 in 1995 to 12 in 1999.<sup>5</sup> (Later incidents were still being investigated.) In addition, Director Freeh reported that there were 7 planned acts of terrorism in the United States that were prevented in 1999. Only a few of these incidents involved chemical facilities. Overall, throughout the 1990s there were 60 attacks characterized as terrorism claiming 182 lives and injuring over 1,932 individuals.<sup>6</sup> In comparison, during the 1980s, there were 267 terrorist or suspected terrorist incidents, which killed 23 people and injured 105.<sup>7</sup> Thus, although the total

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<sup>5</sup> Freeh, Louis J., Director, Federal Bureau of Investigation. Statement for the Record on the Threat of Terrorism to the United States before the United States Senate Committees on Appropriations, Armed Services, and Select Committee on Intelligence. May 10, 2001. [<http://www.fbi.gov/congress/congress01/freeh051001.htm>]

<sup>6</sup> The Oklahoma City bombing of the federal building in 1995 accounts for 168 of the 182 deaths during the decade.

<sup>7</sup> Counterterrorism Division, Counterterrorism Threat Assessment and Warning Unit, Federal Bureau of Investigation, Department of Justice. *Terrorism in the United States* (continued...)

number of terrorist acts in the United States has declined in recent years, the casualties due to terrorism have increased.

The same trends are evident internationally, although there is considerable variation from year to year.<sup>8</sup> Attacks against Americans abroad most often have targeted U.S. businesses: for example, in 2000, 178 of the 206 overseas U.S. targets struck by international terrorists were businesses.<sup>9</sup>

Data for 2001 are still being gathered as investigations of criminal acts continue. The Pentagon and World Trade Center attacks and the attack thwarted by airline passengers on September 11, 2001, however, clearly make 2001 the most costly year on record in terms of U.S. terrorism casualties.<sup>10</sup> As noted by the FBI Executive Assistant Director for Counterterrorism and Counterintelligence, the attack of September 11, 2001, “marked a dramatic escalation in a trend toward more destructive terrorist attacks which began in the 1980s.”<sup>11</sup>

The September 11 attack also reflected a trend toward more indiscriminate targeting among international terrorists. The vast majority of the more than 3,000 victims of the attack were civilians. In addition, the attack represented the first known case of suicide attacks carried out by international terrorists in the United States. The September 11 attack also marked the first successful act of international terrorism in the United States since the vehicle bombing of the World Trade Center in February 1993.<sup>12</sup>

Other potentially important trends identified by intelligence agencies include:

- an increase in activity by loosely affiliated extremists, both domestically and internationally; and
- the propensity of such groups to focus on producing mass casualties.<sup>13,14</sup>

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<sup>7</sup> (...continued)

*1999: 30 Years of Terrorism, A Special Retrospective Edition*, p. 16.

<sup>8</sup> U.S. Department of State. 2001 *Patterns of Global Terrorism 2000*. Appendix C. [[http://www.state.gov/cms\\_images/378699.gif](http://www.state.gov/cms_images/378699.gif)]

<sup>9</sup> Ibid.

<sup>10</sup> The anthrax killings may or may not be found to meet the FBI definition of terror, depending on whether the criminal intended to further political or social objectives.

<sup>11</sup> Watson, Dale L., Executive Assistant Director, Counterterrorism and Counterintelligence, Federal Bureau of Investigation. Statement for the Record on the terrorist threat confronting the United States before the Senate Select Committee on Intelligence. Feb. 6, 2002. [<http://www.fbi.gov/congress/congress02/watson020602.htm>]

<sup>12</sup> Ibid, p. 1.

<sup>13</sup> Ibid.

<sup>14</sup> Counterterrorism Division, Counterterrorism Threat Assessment and Warning Unit, (continued...)

**Trends in Chemical Terrorism.** With respect to chemical and biological terrorism, hoaxes and unsuccessful attempts by terrorists to use chemicals increased throughout the 1990s. Loosely affiliated terrorist groups, in particular, have demonstrated a growing interest in chemical weapons and other weapons of mass destruction, but explosives are still the most frequently employed weapons.<sup>15</sup>

During the 1990s, both international and domestic terrorists attempted to use explosives to release chemicals from manufacturing and storage facilities. Most of these attempts were abroad in war zones such as Croatia, including attacks on a plant producing fertilizer, carbon black, and light fraction petroleum products; other plants producing pesticides; and a pharmaceutical factory using ammonia, chlorine, and other hazardous chemicals. All of these facilities were close to population centers. In the United States, there were at least two instances during the late 1990s when criminals attempted to cause releases of chemicals from facilities. One involved a large propane storage facility, and the other a gas refinery.<sup>16</sup>

Evidence that U.S. chemical facilities may be used by terrorists to gain access to chemicals also exists. For example, one of the 1993 World Trade Center bombers, Nidal Ayyad, became a naturalized U.S. citizen, graduated from Rutgers University, and worked as a chemical engineer at Allied Signal, from which he used company stationery to order chemical ingredients to make the bomb. According to a U.S. Prosecutor in the case against the bombers, though “some suppliers balked when the order came from outside official channels, when the delivery address was a storage park, or when [a co-conspirator] tried to pay for the chemicals in cash,” others did not.<sup>17</sup> Moreover, testimony at the trial of the bombers indicated that they had successfully stolen cyanide from a chemical facility and were training to introduce it into the ventilation systems of office buildings.<sup>18</sup> More recently, chemical trade publications reportedly were found in al Qaeda hideaways.<sup>19</sup>

**Predicted Risks of Chemical Terrorism.** The validity of any risk assessment depends on how much is known about the hazard, risks (probabilities),

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<sup>14</sup> (...continued)

Federal Bureau of Investigation, Department of Justice. *Terrorism in the United States 1999: 30 Years of Terrorism, A Special Retrospective Edition*, p. 25.

<sup>15</sup> *Ibid.*, pp. 17, 25.

<sup>16</sup> Department of Justice. *Assessment of the Increased Risk of Terrorist or Other Criminal Activity Associated with Posting Off-Site Consequence Analysis Information on the Internet*. April 18, 2000. p. 23-24.

<sup>17</sup> Parachini, John V. “The World Trade Center Bombers (1993).” In: Jonathan B. Tucker (ed.) 2000. *Toxic Terror: assessing terrorist use of chemical and biological weapons*. Cambridge, MA: MIT Press. p. 190. Citing the summation statement of Henry J. DePippo, Prosecutor, *United States of America v. Mohammad A. Salameh et al.*, S593CR.180 (KTD), Feb, 16, 1994, p. 8435-8439.

<sup>18</sup> *Ibid.*

<sup>19</sup> Bond, Christopher. Statement on S. 2579. Congressional Record, Daily Edition, June 5, 2002, p. S5043.

adverse effects, events and conditions that lead to or modify adverse effects or risks, and populations or environments that influence or experience adverse effects. The most accurate, and therefore the most useful, risk assessments generally are for familiar, frequently occurring hazards and events with impacts that vary with some regularity – e.g., for severe storms or floods. In contrast, the risk of terrorist activity is unfamiliar (at least in the United States), rarely experienced, and likely to vary significantly over time, depending on rather unpredictable social and political phenomena.

The risk of terrorism targeting chemical facilities is particularly difficult to assess for at least three reasons:

- There are few prior examples of terrorists targeting chemical facilities;
- Numerous factors theoretically may increase or decrease risks; and
- Interactions among factors influencing risks are dynamic and changing.

In part, these difficulties stem from the nature of terrorism and the terrorists' deliberate efforts to do what is least expected – i.e., to defy prediction. For these reasons, most experts have not tried to quantify risks; existing analyses of chemical terrorism risks in the open literature are speculative and qualitative.<sup>20</sup>

Until the mid to late 1990s, reports focused on the acquisition and use of chemical weapons, such as sarin or mustard gas. One of the most comprehensive of these reports was a 1995 review of the open literature on terrorism that was prepared for the Canadian Security Intelligence Service.<sup>21</sup> According to this review of the literature, “[t]hose authors who have speculated about the future terrorist use of chemical agents in particular have generally rated its likelihood as quite high.”<sup>22</sup>

According to some, the risk also appears to be increasing. Many experts today believe that factors that might have inhibited proliferation and use of chemicals as weapons in the past are eroding. For example, some experts hypothesized several years ago that the combination of chemical and strategic skills necessary to create and deploy chemical weapons would prevent the lone terrorist from using them.<sup>23</sup> Security experts now believe that lack of personal expertise no longer limits chemical

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<sup>20</sup> Computerized databases on terrorist acts offer considerable promise for risk analysts who have access. Nevertheless, the unpredictable nature of individuals and of the social and political forces that shape them over time will continue to challenge predictions about future events.

<sup>21</sup> Purver, Ron. Chemical and biological terrorism: The threat according to the open literature. June 1995. Canadian Security Intelligence Service. [[http://www.csis-scrs.gc.ca/eng/miscdocs/tabintr\\_e.html](http://www.csis-scrs.gc.ca/eng/miscdocs/tabintr_e.html)], visited Sept. 28, 2001.

<sup>22</sup> Ibid, Chemical Terrorism, p. 28. This prediction about the use of chemical agents contrasts with conventional wisdom that the probability of chemical weapon use is relatively small. The conventional prediction, however, focuses on military use of chemical weapons in future wars among nations, rather than on chemical use by terrorists.

<sup>23</sup> Ibid., p. 29.



weapon use, because there is a tendency for terrorists with similar extreme views to affiliate loosely with others with complementary skills and abilities. Moreover, the rising level of education worldwide means that more people have the requisite training in chemical engineering,<sup>24</sup> and the Internet has simplified communications, training, and cooperation within geographically dispersed terrorist groups.

Others have argued that chemical attacks would be unlikely, due to the difficulties of producing and effectively delivering chemical agents in sufficient amounts to produce mass casualties.<sup>25</sup> However, while this may be true with regard to military use on a large scale, where weapons are delivered by advanced systems, it is not necessarily relevant to terrorists who may have more limited ambitions. A 1999 report by GAO summarized the situation –

... many conflicting statements have been made in public testimony before Congress ... concerning the ease or difficulty with which terrorists could effectively disseminate a chemical or biological agent on U.S. soil and cause mass casualties.<sup>26</sup>

GAO studied the threat and concluded that the ease or difficulty for terrorists to cause more than 1,000 casualties depends on the chemical or biological agent selected. The report stated –

Experts from the scientific, intelligence, and law enforcement communities told us that terrorists do not need sophisticated knowledge or dissemination methods to use toxic industrial chemicals such as chlorine. In contrast, terrorists would need a relatively high degree of sophistication to successfully cause mass casualties with some other chemical and most biological agents.

On the other hand,

“[t]errorists with less sophistication could make a chemical or biological weapon and disseminate agents, but these would be less likely to cause mass casualties.”<sup>27</sup>

Other factors that might have inhibited chemical use by some terrorists in the past might not apply to loosely affiliated terrorist groups. For example, some experts argue that terrorists supported by nation-states have been reluctant to use chemical

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<sup>24</sup> For example, according to a June 7, 2002, *New York Times* opinion piece, “All-American Osamas,” by Nicholas D. Kristof, one militia member who led a chemical attack against an Internal Revenue Service office had a degree in chemistry from Massachusetts Institute of Technology. Authorities reportedly believe that he made sarin in his basement. The author indicated his source for this information was Jessica Stern, a Harvard University lecturer on terrorism and author of *The Ultimate Terrorists*, published in 1999 by Harvard University Press, Cambridge, MA.

<sup>25</sup> Purver, p. 5-13.

<sup>26</sup> U.S. Congress. General Accounting Office. *Combating Terrorism: Need for Comprehensive Threat and Risk Assessments of Chemical and Biological Attacks*. GAO/NSIAD-99-163. Sept. 1999. p. 1.

<sup>27</sup> *Ibid.*, p. 3.

weapons for fear of offending other nations and neutral parties, particularly if the sponsors were signatories of the Chemical Weapons Convention.<sup>28</sup> Another possible deterrent to chemical use, fear of retaliation, probably is of little concern to attackers with no identifiable homeland or headquarters. Lack of a homeland might also lessen concern about environmental damage that may be associated with chemical production. Finally, one must presume that occupational safety would be of limited concern to terrorists who are not accountable to a government, and who are willing to sacrifice their own lives for a religious, political, or social cause.

However, many experts believe that the relative risk of terrorism involving chemical weapons remains small. This point was stressed by John V. Parachini, a senior associate at the Center for Nonproliferation Studies, Monterey Institute of International Studies at a 1999 hearing before the U.S. House of Representatives, Committee on Government Reform, Subcommittee on National Security, Veterans Affairs, and International Relations. Referring to the risk of any use of chemical or biological weapons he stated:

. . . attacks with chemical and biological weapons are strikingly infrequent and the number of fatalities and casualties are far lower than those caused by conventional explosives. According to an analysis of 105 U.S. incidents featured in the Monterey Institute database from 1900 to 1998, only one fatality resulted from a [chemical or biological weapon] attack. This incident involved a 1973 assassination of an Oakland, California school superintendent by the Symbionese Liberation Army.<sup>29</sup>

**Severity of Harm.** It is generally agreed that chemical agents are likely to be the least lethal of the three “weapons of mass destruction.” In part, this judgment reflects the difficulty of producing and delivering large quantities of a lethal chemical to the target area prior to release. On the other hand, industrial chemicals and pesticides are readily available for purchase, and are stored in large quantities in thousands of locations throughout the United States, often near population centers. A key question for chemical facilities then is “How much damage could terrorists do using existing stationary chemical manufacturing, processing, distribution, and storage facilities?”

There are two key sources of information for answering this question: accident reports and hazard assessments conducted by facility personnel or outside experts. There is no comprehensive database for either kind of information,<sup>30</sup> but various groups have used publicly available data to estimate hazard potential, usually limited to accidental releases of chemicals from chemical facilities.

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<sup>28</sup> Purver, p. 28.

<sup>29</sup> U.S. Congress. House. Committee on Government Reform. Subcommittee on National Security, Veterans’ Affairs, and International Relations. Combating Terrorism: Assessing the Threat. Hearings, 106<sup>th</sup> Cong., 1<sup>st</sup> Sess., Oct. 20, 1999. Washington, U.S. Govt. Print. Off., 2000, p. 55-56.

<sup>30</sup> The most comprehensive, but still incomplete, listing of chemical spills and releases is kept by the National Response Center and available on the Internet at [<http://www.nrc.uscg.mil/foia.htm>]

A 1998 report by the U.S. Public Interest Research Group (US PIRG) and the National Environmental Law Center, *Too Close to Home: Chemical Accident Risks in the United States*, addressed the distribution of chemical facilities in the United States relative to population distribution. It stated that “more than 41 million Americans live within range of a toxic cloud that could result from a chemical accident at a facility located in their home zip code.”<sup>31</sup> Those 41 million Americans live in zip codes that contain manufacturing companies with “vulnerable zones” extending more than three miles from the facility, the report states. A “vulnerable zone” is the geographic area that could be affected by the worst possible accident at a facility.<sup>32</sup> According to the report, the estimate of 41 million Americans at risk may underestimate the hazard, because it was based on “assumptions about facility and atmospheric conditions that would lead to small vulnerability zones.”<sup>33</sup> To produce the estimate, the study author stated that he used standard methodology used by the U.S. Environmental Protection Agency (EPA) and data on chemical storage from EPA’s 1995 Toxics Release Inventory, a database of routine releases of industrial chemicals from manufacturing facilities.

Hazard estimates by James C. Belke, an EPA employee in the Chemical Emergency Preparedness and Prevention Office, are more detailed. Based on a preliminary analysis of approximately 15,000 facility risk management plans for chemical facilities that were filed under the Clean Air Act, Section 112(r) before September 25, 2000,<sup>34</sup> Belke concluded that the median distance from a facility to the outer edge of its vulnerable zone is 1.6 miles in the case of toxic worst case scenarios, and 0.4 miles for flammable worst case scenarios. However, many facilities reported vulnerable zones potentially extending 14 miles from the facility (primarily for releases in urban areas of chlorine stored in 90-ton rail tank cars) and 25 miles (for releases in rural terrain of chlorine stored in 90-ton rail tank cars). Other chemicals for which reported vulnerable zones equaled or exceeded 25 miles include anhydrous ammonia, hydrogen fluoride, sulfur dioxide, chlorine dioxide, oleum (fuming sulfuric acid), sulfur trioxide, hydrogen chloride, hydrocyanic acid, phosgene, propionitrile, bromine, and acrylonitrile.)

Belke found the median population “affected” in a worst case accident was 15 people, for a flammable substance, while the median for toxic substances was 1,500 people.<sup>35</sup> (“Affected” means potentially exposed. It is highly unlikely that all people within the vulnerable zone would be exposed due to a single release. However,

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<sup>31</sup> Laplante, Allison. 1998. *Too Close To Home: A Report on Chemical Accident Risks in the United States*. U.S. Public Interest Research Group. [<http://uspirg.org/uspirg.asp?id2=5067&id3=USPIRG&>]

<sup>32</sup> “Vulnerable zones” apply to facilities required to prepare risk management plans under the Clean Air Act, Section 112(r). By definition, people within the zone could (but would not necessarily) sustain serious injuries from short-term exposures.

<sup>33</sup> Laplante, Executive Summary. p. 2.

<sup>34</sup> Belke, James C. Chemical accident risks in U.S. industry – A preliminary analysis of accident risk data from U.S. hazardous chemical facilities. Sept. 25, 2000. p. 24. [<http://www.epa.gov/swercepp/pubs/stockholmpaper.pdf>]

<sup>35</sup> Belke, p. 26.

anyone within the zone could be in the path of the chemical released, given certain environmental conditions.) Further EPA analysis of risk management plans submitted by facilities handling chemicals covered by the CAA Section 112 revealed that at least 123 plants reported a worst-case scenario with a vulnerability zone containing more than a million people.<sup>36</sup> The analysis also found that more than 700 plants could threaten 100,000 people, and at least 3,000 facilities could threaten 10,000 people in the vicinity.<sup>37</sup>

The Department of Justice (DOJ) analyzed EPA data and concluded that among facilities submitting risk management plans to EPA, more than 7,000 facilities projected worst case scenarios for toxic substances that could potentially affect more than 1,000 people.<sup>38</sup> Almost 1,700 facilities reported the possibility that a less extreme accident might potentially affect more than 1,000 people.<sup>39</sup>

Histories of actual accidents (as opposed to hypothetical worst-case scenarios) for facilities submitting risk management plans to EPA prior to October 21, 1999, were summarized in a working paper prepared by the Center for Risk Management and Decision Processes at the Wharton School, University of Pennsylvania.<sup>40</sup> Of 14,500 reporting facilities, 1,145 reported 1,913 accidents between June 21, 1994 and June 20, 1999. Of the 1,145 facilities reporting accidents, 346 facilities had multiple accidents. Half of the chemicals for which risk management planning is required under the CAA Section 112(r) were involved in accidents. Half of the accidents resulted in reported injuries to workers. Accidents caused a reported 1,897 injuries and 33 deaths to employees, 141 injuries and no deaths to non-employees. No deaths were reported off-site. However, over 200,000 community residents were involved in evacuations and shelter-in-place incidents.<sup>41</sup>

Further analysis by the Wharton group revealed that the risk of accidental chemical releases and of worker injuries or property damage increased with the size

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<sup>36</sup> Belke, J. (2001), "Chemical Accident Risks in U.S. Industry - A preliminary analysis of accident risk data from U.S. hazardous chemical facilities", Proceedings of the 10<sup>th</sup> International Symposium on Loss Prevention and Safety Promotion in the Process Industries, Stockholm, Sweden, Pasman, Fredholm, and Jacobson (eds.), Elsevier Science B.V. – Note: This does not mean that more than a million people would be exposed and injured, but rather that, depending on wind direction and other factors, some portion of the population in the zone might be exposed and injured.

<sup>37</sup> Ibid.

<sup>38</sup> Department of Justice, p. 13.

<sup>39</sup> Ibid.

<sup>40</sup> Kleindorfer, Paul R., Harold Feldman, and Robert A. Lowe. Accident Epidemiology and the U.S. Chemical Industry: Preliminary Results from RMP\*Info. Working Paper 00-01-15. Center for Risk Management and Decision Processes, The Wharton School, University of Pennsylvania. Revised March 6, 2000. 27 p.  
[[http://opim.wharton.upenn.edu/risk/epi\\_downloads.html](http://opim.wharton.upenn.edu/risk/epi_downloads.html)]

<sup>41</sup> Ibid. p. 9.

of the facility (from 10 to 1,000 full-time equivalent employees or FTEs).<sup>42</sup> Note that this refers to accidents of any kind, not to worst-case events.) In addition, facilities reporting that they handled large amounts and many types of chemicals had much higher accident rates than facilities handling smaller amounts and fewer types of chemicals. The probability that a facility had experienced a chemical accident of any size approached 100% for the very largest chemical manufacturers. Toxic chemicals were more strongly associated with worker injuries, while flammable chemicals were more strongly associated with property damage. No regional trends in accident rates were discovered – i.e., facilities in various geographical regions had similar accident rates.

In contrast to the above figures, which all were based on hypothetical or actual accidents described in risk management plans, the *Washington Post* reported March 12, 2002, that a classified study conducted by the U.S. Army Surgeon General dated October 29, 2001, found that a terrorist attack resulting in a chemical release in a densely populated area could injure or kill as many as 2.4 million people.<sup>43</sup> According to the news article, the study found “even middle-range casualty estimates from a chemical weapons attack or explosion of a toxic chemical manufacturing plant are as high as 903,400 people.”<sup>44</sup> The worst-case estimate of 2.4 million casualties from a chemical release was roughly half the surgeon general’s estimate for casualties due to widespread use of biological weapons, according to the report. The Army Surgeon General recently explained that the estimate of 2.4 million casualties is of “the number of people who might request medical treatment during a total release of a large industrial chemical manufacturing plant, in a densely populated area, and under ideal weather conditions for maximum exposure.”<sup>45</sup> As in most studies of this kind, some question the magnitude and likelihood of the casualty estimates.

**Chemical Site Vulnerability.** CRS identified two publicly available reports that assess site security at U.S. chemical plants. In addition, a recently published investigative report by a newspaper documents many unsupervised visits by reporters to facilities subject to risk management planning provisions under the Clean Air Act. The studies and newspaper accounts are summarized below.

Prior to September 11, an assessment of chemical plant site security by the Agency for Toxic Substances and Disease Registry (ATSDR) was considered by many to be the most comprehensive analysis that was publicly available. ATSDR researchers reviewed national statistics on domestic terrorism compiled by the FBI

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<sup>42</sup> Elliott, Michael R., Paul Kleindorfer, and Robert A. Lowe. The Role of Hazardousness and Regulatory Practice in the Accidental Release of Chemicals at US Industrial Facilities. Working Paper 01-37-PK. Risk Management and Decision Processes Center, The Wharton School, University of Pennsylvania. Summer 2001. 22 p. [<http://opim.wharton.upenn.edu/risk/downloads/01-37-PK.pdf>]

<sup>43</sup> Pianin, Eric. “Study assesses risk of attack on chemical plant.” *Washington Post*, Mar. 12, 2002. p. A8.

<sup>44</sup> *Ibid.*

<sup>45</sup> Army recants attack estimates. *Chemical Week*, May 22, 2002. p 38.

in 1995, and interviewed security staff from facilities and potential targets in one community with numerous chemical plants.<sup>46</sup> ATSDR researchers concluded –

- “security at chemical plants ranged from fair to very poor;”<sup>47</sup>
- chemical plant security managers “were very pessimistic about their ability to deter sabotage by employees, yet none of them had implemented simple background checks for key employees such as chemical process operators;” and
- “none of the corporate security staff had been trained to identify combinations of common chemicals at their facilities that could be used as improvised explosives and incendiaries.”<sup>48</sup>

The full ATSDR report was never made public, but a DOJ report noted that –

among the ‘soft targets’ that the ATSDR identified as potential terrorist sites were chemical manufacturing plants (chlorine, peroxides, other industrial gases, plastics, and pesticides); compressed gases in tanks, pipelines, and pumping stations; and pesticide manufacturing and supply distributors.<sup>49</sup>

The DOJ released a study April 18, 2000, describing the risk of terrorism aimed at chemical plants.<sup>50</sup> It concluded that “the risk of terrorists attempting in the foreseeable future to cause an industrial chemical release is both real and credible.”<sup>51</sup> The study also noted that security at many industrial facilities generally is “not as substantial as the security at other comparable potential terrorist targets.”<sup>52</sup>

In April and May, 2002, six to seven months after September 11, 2001, the *Pittsburgh Tribune-Review* published a series of articles describing an investigation of plant security conducted by the paper’s reporters. On April 7, 2002, the newspaper stated that “anyone has unfettered access to more than two dozen potentially

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<sup>46</sup> ATSDR. *Industrial Chemicals and Terrorism: Human Health Threat Analysis, Mitigation and Prevention*.  
[<http://www.techstuff.com/terror/terror.htm>], visited July 26, 2002.

<sup>47</sup> Greenpeace activists dramatized the poor security at one chlorine manufacturing plant in February 2001. According to a report in the *Washington Post*, activists scaled the fence of a large Dow Chemical plant near Baton Rouge, Louisiana, and gained access to the control panel that regulates discharges into the Mississippi River. (“Toxic chemicals’ security worries officials.” *Washington Post*, Nov. 12, 2001, p. A14.)

<sup>48</sup> ATSDR studied two communities in different parts of the United States but only interviewed plant security personnel in one community.

<sup>49</sup> Department of Justice, p. 27.

<sup>50</sup> *Ibid.*

<sup>51</sup> *Ibid.*, p. 2.

<sup>52</sup> *Ibid.*, p. 30.

dangerous plants in the region” (referring to western Pennsylvania).<sup>53</sup> The author of the report continued:

The security was so lax at 30 sites that in broad daylight a Trib reporter – wearing a press pass and carrying a camera – could walk or drive right up to tanks, pipes and control rooms considered key targets for terrorists.

The report was based on reporters’ trips to 30 plants in western Pennsylvania which have filed risk management plans under the Clean Air Act, Section 112. Two of the plants are among the 123 plants nationwide that have projected potential risks to more than 1,000,000 residents in the event of a worst-case accident or attack. The 30 companies constituted more than half of the 61 sites in the region required to file risk management plans. Fifteen of the sites to which reporters gained unchallenged access were water treatment facilities in Pennsylvania and Maryland.

In May, another *Tribune-Review* article described a similar investigation of 30 additional plants in Houston, Baltimore, and Chicago.<sup>54</sup> The report concluded that security was lax at some of “the potentially deadliest plants” in all three cities; access was easy to some sites owned by corporations with large security budgets; employees, customers, neighbors, and contractors “not only let a stranger walk through warehouses, factories, tank houses and rail depots, but also gave directions to the most sensitive valves and control rooms;” and access to 19 sites was allowed due to “unguarded rail lines and drainage ditches, dilapidated or nonexistent fences, open doors, poorly angled cameras and unmanned train gates.”

Chemical manufacturers and users contacted by reporters said that they had bolstered security recently. Several site managers reported that they made immediate changes in procedures or construction plans in response to security breaches by the reporters. But security cannot be ensured “overnight,” according to the president of the Pennsylvania Chemical Industry Council,<sup>55</sup> and it can be expensive. For example, the newspaper reported that U.S. Steel spends more than \$1 million each year to equip, train, and hire its own hazardous chemicals response team, firefighters, paramedics, and gate guards at its coke factory.<sup>56</sup>

**Conclusion.** Whether recent trends in domestic and international terrorism will continue into the future, and whether they will be reflected in risks to U.S. chemical facilities, is unknown. Historically, there have been very few terrorist attacks on chemical facilities in the United States. Therefore, the estimated risk of death and injury from such attacks in the immediate future is low relative to the

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<sup>53</sup> Prine, Carl. Lax security exposes lethal chemical supplies. *Pittsburgh Tribune-Review*, April 7, 2002. [[http://www.pittsburghlive.com/x/tribunereview/specialreports/potentialfordisaster/s\\_64612.html](http://www.pittsburghlive.com/x/tribunereview/specialreports/potentialfordisaster/s_64612.html)], visited Sept. 6, 2002.

<sup>54</sup> Prine, Carl. Chemicals pose risks nationwide. *Pittsburgh Tribune-Review*, May 5, 2002. [[http://www.pittsburghlive.com/x/tribune-review/specialreports/potentialfordisaster/s\\_69664.html](http://www.pittsburghlive.com/x/tribune-review/specialreports/potentialfordisaster/s_69664.html)], visited Sept. 6, 2002.

<sup>55</sup> Prine, April 7, 2002.

<sup>56</sup> *Ibid.*

likelihood of other hazardous events, such as industrial accidents or terrorist attacks on other targets using conventional weapons. For any individual chemical plant, the risk of attack is extremely small. However, the overall risks to chemical facilities may be increasing.

In contrast to the low probability of chemical terrorism, possible consequences for human health and the environment from such an event could be severe. Moreover, limited evidence suggests that chemical facilities may be “soft targets,” lacking in adequate safeguards against criminal and terrorist attacks.

## Existing Federal Requirements to Reduce Risks at Chemical Facilities

Two key federal laws require or encourage certain chemical facility operators to reduce risks to the general public associated with releases of hazardous chemicals: the Emergency Response and Community Right-to-Know Act (EPCRA) and the Clean Air Act (CAA). Both focus on accidental releases of hazardous chemicals.

**EPCRA.** In 1986, two years after the Bhopal accident, Congress enacted EPCRA (codified at 42 U.S.C. 11001-11050) as Title III of the Superfund Amendments and Reauthorization Act (P.L. 99-499).<sup>57</sup> EPCRA mandated the establishment of State Emergency Response Commissions (SERCs) and Local Emergency Response Committees (LEPCs) to coordinate planning and response to potentially large releases of specified “extremely hazardous substances.”<sup>58</sup> The Act requires facility operators, LEPCs, and SERCs to prepare contingency plans for such releases.

Facility managers are required to provide information to LEPCs and local emergency responders (fire fighters, police officers, etc.) about chemicals present at facilities and to notify those officials in the event of a sudden release. EPCRA requires local officials to provide information about emergency plans and chemical hazards to the general public.

EPCRA’s reporting and disclosure requirements are meant to facilitate planning, but sometimes they also promote risk reduction. For example, facility managers concerned about community relations sometimes reduce use of particularly toxic or

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<sup>57</sup> For additional information about EPCRA, see CRS Report RL30798, *Environmental Laws: Summaries of Statutes Administered by the Environmental Protection Agency*.

<sup>58</sup> EPCRA required EPA to list “extremely hazardous substances” and to establish threshold planning quantities for each substance. Originally, Congress defined chemicals as “extremely hazardous substances” if they appeared on a list EPA published in November 1985 as Appendix A in “Chemical Emergency Preparedness Program Interim Guidance.” However, Congress gave EPA authority to revise the list and the threshold quantities of chemicals. Based on listing criteria, the intent appears to be to include only chemicals in quantities that could harm people exposed to them for only a short period of time. Currently, there are approximately 356 such substances listed. For the list, see [<http://www.epa.gov/swercepp/ehs/ehsalpha.html>], visited June 18, 2002.



otherwise hazardous materials, sometimes to the point that they no longer have to report, because they no longer handle reportable quantities of EPCRA chemicals. In other cases, the public disclosure requirement may encourage them to change chemical processes and handling in order to reduce the risk of reportable spills.

Although EPCRA requires facility reporting and cooperation in local emergency response planning, and it may encourage risk reduction, it stops short of requiring facilities to assess or reduce risks of chemical releases.<sup>59</sup> Instead, the Act directed the EPA to study the problem and to identify any gaps in federal regulation.

**CAA Section 112(r).** In 1990, data accumulated by EPA on chemical accidents in the United States prompted Congress again to address the threat of catastrophic releases of chemicals that might cause immediate deaths or injuries in communities. It amended the Clean Air Act (CAA) to mandate EPA oversight of risk management planning at facilities that handle more than specified threshold quantities of hazardous substances.<sup>60</sup> The Act defined “hazardous substances” to include chlorine, anhydrous ammonia, methyl chloride, ethylene oxide, vinyl chloride, methyl isocyanate, hydrogen cyanide, ammonia, hydrogen sulfide, toluene diisocyanate, phosgene, bromine, anhydrous sulfur dioxide, sulfur trioxide, and at least 100 other chemicals to be designated by EPA. EPA was directed to designate chemicals posing the greatest risks to human health or to the environment, based on three criteria: severity of potential acute adverse health effects, the likelihood of accidental releases, and the potential magnitude of human exposure. EPA promulgated a list of 77 acutely toxic substances, 63 flammable gases and volatile flammable liquids, and “high explosive substances” (59 *Federal Register* 4478, Jan. 31, 1994). The list was amended March 13, 2000, to exclude flammable substances when used as a fuel, or held for sale as a fuel at a retail facility.<sup>61</sup>

The CAA Section 112(r) imposes “a general duty” on owners and operators of facilities producing, processing, handling or storing any “extremely hazardous substance” to detect and prevent or minimize accidental releases and to provide prompt emergency response to a release in order to protect human health and the environment. The act requires owners and operators of covered facilities to prepare Risk Management Plans (RMPs) that summarize the potential threat of sudden, large releases of certain chemicals, including the results of off-site consequence analysis (OCA) for a worst-case chemical accident, and facilities’ plans to prevent releases and mitigate any damage. Plans were to be submitted to EPA and made “available

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<sup>59</sup> Many proponents of the reporting provisions of EPCRA argue, however, that public disclosure of information about chemicals present and released into communities sometimes prompts facility operators to reduce risks.

<sup>60</sup> The Clean Air Act Amendments of 1990 gave responsibility for the prevention of accidental chemical releases to the Occupational Safety and Health Administration (OSHA) and EPA. OSHA has responsibility for the protection of workers from accidental chemical releases and has promulgated the Process Safety Management Standard (29 CFR 1910.119) in response to this requirement. EPA has incorporated the OSHA Process Safety Management Standard as the chemical accident prevention program for certain facilities subject to both rules.

<sup>61</sup> 65 *Federal Register* 13243-13250.

to the public” by June 21, 1999. EPA is required to review RMPs regularly, and if necessary, require revisions. EPA has delegated this responsibility to some states and localities.<sup>62</sup> (All states have authority to review RMPs at facilities that are major sources of air pollution, which are required to obtain permits under Title V of the Clean Air Act.)

In October 1996, the Accident Prevention Subcommittee of the Clean Air Act Advisory Committee to EPA created the Electronic Submission Workgroup to consider the technical and practical issues associated with an electronic database of risk management plans. By spring 1997, the Workgroup unanimously agreed that EPA should provide full, unrestricted access via the Internet to most RMP information. However, advisors could not reach consensus regarding access to OCA data.

There were concerns that in facilitating electronic access to the general U.S. public through the Internet, EPA also would be facilitating access to these data internationally, which might permit misuse by terrorists.<sup>63</sup> Several members of the Accident Prevention Subcommittee recommended EPA undertake a security study to determine how much risk might increase as a result of putting OCA data on the Internet. Aegis Research Corporation, ICF Incorporated, and Science Applications International Corporation conducted the security study for EPA. The Agency concluded from the study that—

... the risk (although still very small) was slightly more than two times higher with unrestricted availability of the RMP with OCA data on the Internet. This increase reflects several factors, including the nature of the OCA data elements and the enhanced accessibility of data on the Internet to an international audience. Taken together, the primary utility of the unrestricted RMP and OCA data to a terrorist emerges from the capability to scan across the entire country for the “best” targets.<sup>64</sup>

In December 1997, EPA began discussions with the Federal Bureau of Investigation (FBI) and other federal agencies about the electronic RMP distribution plan. National security concerns centered on the OCA data and their potential utility to terrorists. An interagency agreement was reached in late October 1998 that OCA data would not be included in RMP information placed on the Internet. Instead, EPA would make “appropriate” OCA data available in some form on request, but access

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<sup>62</sup> EPA has delegated authority to implement CAA Section 112(r) to the following states, territories, and localities: Delaware, Florida, Georgia, Kentucky, Mississippi, New Jersey, North Carolina, Ohio, South Carolina, Puerto Rico, Virgin Islands, Jefferson County, Kentucky, Buncombe County and the City of Asheville, North Carolina, Forsyth County, North Carolina, and Allegheny County, Pennsylvania.  
[<http://www.epa.gov/swercepp/pubs/112r-sts/112r-sts.html>], visited Aug. 30, 2002.

<sup>63</sup> U.S. EPA. *Security Study: An Analysis of the Terrorist Risk Associated with the Public Availability of Offsite Consequence Analysis Data under EPA’s Risk Management Program Regulations*. EPA 550-R97-003. Dec. 1993. p. 1.

<sup>64</sup> *Ibid.* p. 10.

would be restricted and not anonymous.<sup>65</sup> The possibility that OCA data could have been distributed via the Internet remained, however, because it could have been obtained and distributed by any citizen under the Freedom of Information Act, according to the EPA Legal Counsel.

To address the security concerns raised by the Section 112(r) requirements, the Clinton Administration submitted draft legislation to Congress May 7, 1999. Congress enacted an amended version of the legislation as an amendment to S. 880, the Chemical Safety Information, Site Security and Fuels Regulatory Relief Act (Public Law 106-40). The new law amended Section 112 of the CAA to exempt OCA data from disclosure under the Freedom of Information Act, and limited public availability until EPA and DOJ issued regulations in August, 2000.

The final RMP regulation on data access was published August 4, 2000.<sup>66</sup> It allows public access to paper copies of sensitive OCA information through federal reading rooms, approximately one per state, and provides Internet access to the OCA data elements that pose the least serious criminal risk. State and local agencies are encouraged to provide the public with read-only access to OCA information on local facilities. At the federal reading rooms, members of the public may read OCA information for up to 10 facilities per calendar month and for all facilities with potential effects in the jurisdiction of the local emergency planning committee. State and local officials and other members of the public may share OCA information as long as the data are not conveyed in the format of sensitive portions of the RMP or any electronic database developed by EPA from those sections.<sup>67</sup> A Clinton Administration proposal to implement the final rule (66 *Federal Register* 4021, Jan. 17, 2001) would have allowed people to view plans of facilities outside their local area and enhanced access for “qualified researchers.” The draft plan was rescinded by the Bush Administration (66 *Federal Register* 15254, Mar. 16, 2001).

The 1999 Act also directed the U.S. General Accounting Office (GAO) to report to Congress within 3 years (i.e., before August 2002) on “the adequacy of chemical information required to be submitted to local emergency response personnel to help them respond to chemical incidents, the adequacy of the delivery of that information, and the level of compliance with the requirement to submit the information.”<sup>68</sup> That report was released July 31, 2002. GAO concluded that EPA officials believe industries generally are complying with reporting requirements. GAO’s conclusions

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<sup>65</sup> Blitzer, Robert M., Former Section Chief, Domestic Terrorism/Counterterrorism Planning Section, Federal Bureau of Investigation. Testimony before the Senate Committee on Environment and Public Works, Subcommittee on Clean Air, Wetlands, Private Property and Nuclear Safety. March 16, 1999.

<sup>66</sup> 65 *Federal Register* 48107-48133.

<sup>67</sup> EPA Fact Sheet. “Chemical Safety Information, Site Security and Fuels Regulatory Relief Act: Public Distribution of Off-Site Consequence Analysis Information.” EPA 550-F00-012, Aug. 2000.

<sup>68</sup> U.S. GAO. *Chemical Safety: Emergency Response Community Views on the Adequacy of Federally Required Chemical Information*. GAO-02-799. Washington, DC: U.S. Govt. Print. Off. 23 pp.

about the adequacy of information and its delivery were tentative and could not be generalized to the universe of LEPCs.

DOJ also was directed to report to Congress within 3 years on the extent to which RMP regulations led to actions “that are effective in detecting, preventing, and minimizing the consequences of releases of regulated substances that may be caused by criminal activity,” the vulnerability of facilities to criminal and terrorist activity, “current industry practices regarding site security,” and security of transportation of substances listed under CAA Section 112(r).<sup>69</sup> The law directed DOJ to consult with state, local and federal agencies, affected industry, and the public in preparing the report, and to submit any recommendations to Congress. An interim report was due within one year of enactment (i.e., by August 2000). DOJ missed the interim report deadline and expects to miss the final deadline as well. The Natural Resources Defense Council (NRDC) filed a lawsuit against DOJ March 11, 2002, asserting that DOJ unlawfully withheld or unreasonably delayed the report’s submission to Congress.<sup>70</sup> The interim report was released to Congress May 30, 2002, but withheld from the public. On June 3, 2002, DOJ filed a motion to dismiss the NRDC lawsuit. The NRDC moved to dismiss its lawsuit on July 1, 2002. A General Accounting Office (GAO) study released October 10, 2002, concluded that DOJ failed to complete the mandated study, and that the Department had the funds to do so, although it had no specific appropriation. “Generally, when Congress imposes a new requirement on an agency but does not appropriate funds specifically to implement it, the agency must use existing appropriations to fund the requirement.”<sup>71</sup>

## After September 11, 2001

**Administrative Initiatives.** The events of September 11, 2001, bolstered the view that access to information about facilities should be restricted if it might make them more vulnerable to terrorist attacks. This led EPA to limit Internet access to “sensitive” data.

Early in October 2001, EPA removed from the Internet general information from risk management plans – for example, about the physical state and concentrations of chemicals at facilities and the duration of a possible chemical release – which previously had been considered acceptable for Internet posting. EPA reportedly found no other information that should be removed from the Internet during the next few months, but officials remained concerned about posted information on facility locations that might be of use to criminals and terrorists.<sup>72</sup> On March 14, 2002, EPA restricted access to Envirofacts, a link to several EPA databases that allowed the user to access facility-specific information about chemical

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<sup>69</sup> 42 USC 7412(r)(7)(H)(xi).

<sup>70</sup> *Natural Resources Defense Council v. Ashcroft*, D.D.C., No. 02-0449, Mar. 11, 2002.

<sup>71</sup> U.S. General Accounting Office. 2002. *Homeland Security: Department of Justice's Response to Its Congressional Mandate to Assess and Report on Chemical Industry Vulnerabilities* (GAO-03-24R).

<sup>72</sup> Preston, Meredith. “Agency considers new ways to make data on Internet site available to public,” *Daily Environment Report*, Feb. 22, 2002, p. A-14.

releases, compliance with environmental laws, and other issues. The next week, the White House sent a memorandum to all federal agencies, ordering them to further review and protect information that might be used to threaten national security or public safety. On May 6, 2002, President Bush signed an administrative order granting the EPA Administrator the authority to classify as “secret” information that might pose a national security risk.<sup>73</sup>

On the other hand, the attacks of September 11 led to increased communication among government officials at all levels, as well as facility owners and operators. For example, EPA advised pesticide companies and applicators to be especially vigilant about physical security of chemicals and equipment. The Agency issued a “chemical safety alert” tailored to the security needs of the pesticide industry, based on an earlier paper on site security of chemical plants that first was issued in February 2000.<sup>74</sup>

A federal interagency working group chaired by the Office of Homeland Security was convened to consider security needs at chemical facilities and to develop procedures for assessing and reducing terrorist risks. According to news reports, the plan is nearly complete, but some details remain at issue.<sup>75</sup>

**Private Sector Initiatives.** Although trade associations for the chemical industries have been engaged in emergency planning for many years, and began developing guidelines for site security at least a year before September 11, 2001, the events of that date infused on-going efforts with commitment and energy that previously were not evident.

The American Chemistry Council (ACC, formerly the Chemical Manufacturers Association), the Chlorine Institute, Inc., and the Synthetic Organic Chemical Manufacturers Association issued *Site Security Guidelines for the U.S. Chemical Industry* on October 23, 2001. The guidelines build on “Management Practice 15: Site Security” in the Responsible Care® Employee Health and Safety Code. Responsible Care® is the ACC’s response to general public concerns about the manufacture and use of chemicals. Members of the ACC are required to commit to the principles of Responsible Care® and “to support a continuing effort to improve the industry’s responsible management of chemicals” by continually improving their health, safety and environmental performance; listening and responding to public concerns; assisting other companies to achieve optimum performance; and reporting their goals and progress to the public.”<sup>76</sup> There are 180 corporate ACC members which operate approximately 1,000 chemical facilities, representing about 90% of

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<sup>73</sup> 67 *Federal Register* 31109, May 9, 2002.

<sup>74</sup> The alerts are available through the EPA website at: [www.epa.gov/swercepp/p-small.htm#alerts], visited June 28, 2002.

<sup>75</sup> Heilprin, John. “Government to require 15,000 chemical, waste, water plants to assess terrorism risks, make fixes,” *The Associated Press*, via NewsEdge Insight, June 7, 2002.

<sup>76</sup> The principles of Responsible Care® are listed on the ACC website at [http://www.americanchemistry.com/], visited July 1, 2002.

U.S. chemical production capacity.<sup>77</sup> The ACC guidelines for site security are general, and must be adapted by chemical companies to meet site requirements.

During April 2002, ACC circulated a draft of a Security Code of Management Practices –

to help companies achieve continuous improvement in security performance using a risk-based approach to identify, assess and address vulnerabilities, prevent or mitigate incidents, enhance training and response capabilities, and maintain and improve relationships with key stakeholders.<sup>78</sup>

On June 5, 2002, the ACC Board of Directors voted to make the security code mandatory for ACC members. Some key requirements of the code include:

- training and drills for employees, contractors, customers, and suppliers;
- consideration of process changes, material substitutions, and other inherently safer approaches to chemical production;
- evaluation, response, and reporting of security threats; and
- internal audits.<sup>79</sup>

ACC members are required to evaluate site security using vulnerability assessment methodology equivalent to that developed by the Department of Energy's Sandia Laboratories for the Department of Justice<sup>80</sup> or by the Center for Chemical Process Safety (an industry-funded research center). ACC members will begin by assessing security, including computer security, at high-risk facilities, as well as from supplier to manufacturer, to wholesaler, to retailer, and finally to customer. After needed security measures have been put into place, the ACC code requires verification by an independent third party. However, the security code does not require expenditures for risk reduction; rather it recommends decisions should be based on an evaluation of risks and costs.

In addition to developing guidelines and a management code on site security, ACC and other chemical trade organizations have been communicating extensively with one another and with government officials about how to reduce the risks of chemical terrorism. For example, ACC and the Association of American Railroads formed a taskforce to develop strategies to ensure the safety of communities near

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<sup>77</sup> Heilprin, John. "Government to require 15,000 chemical, waste, water plants to assess terrorism risks, make fixes," *The Associated Press*, via NewsEdge Insight, June 7, 2002.

<sup>78</sup> ACC. Responsible Care® Security Code of Management Practices Draft Concepts, April 18, 2002.

<sup>79</sup> Responsible Care practitioners website. [<http://www.americanchemistry.com/cmawebsite.nsf/s?readform&nnar-5b7jx8>], visited July 1, 2002.

<sup>80</sup> National Institute of Justice, U.S. Department of Justice. *Chemical Facility Vulnerability Assessment Methodology*, NCJ 195171, July 2, 2002. [<http://www.ojp.usdoj.gov/nij/pubs-sum/195171.htm>], visited July 2, 2002.

chemical and rail facilities.<sup>81</sup> In addition, as mentioned above, the Center for Chemical Process Safety is developing a risk-based methodology for assessing the vulnerability of chemical facilities to terrorist attacks. The Synthetic Organic Chemical Manufacturers Association (SOCMA) has developed a vulnerability assessment methodology for smaller chemical producers.<sup>82</sup> According to Tom Hall, director of stewardship for CropLife America (a pesticide industry trade association), pesticide and fertilizer distributors represented by CropLife America, the Fertilizer Institute, and the Agricultural Retailers Association formed a working group to tailor a vulnerability assessment methodology for rural facilities, where theft is a greater threat than a direct attack on a facility.<sup>83</sup> A document, *Guidelines to Help Ensure a Secure Agribusiness*, was released October 24, 2002.<sup>84</sup>

## Policy Options

September 11, 2001 prompted policy makers to reconsider federal policy options regarding potential terrorist threats to chemical facilities. A range of possible strategies is summarized below.

**Status quo.** Congress might rely on existing mechanisms in the public and private sectors to continuously evaluate and improve site security. Federal statutes already mandate facility assessments of chemical hazards and planning to prevent, mitigate, and respond to releases of hazardous chemicals. And the events of September 11, 2001, undoubtedly have reinvigorated implementation efforts by federal, state, and local government officials, as well as facility operators. Moreover, trade associations have developed vulnerability assessment methodologies to facilitate planning for diverse types of facilities.

However, with the reorganization of the federal executive branch through establishment of a new Department of Homeland Security (DHS), the status quo will inevitably be shifting. Many in Congress and in the current administration have proposed changes in the way the federal government assesses risks, oversees security for critical infrastructure, and protects information about vulnerability of facilities. In addition, some have questioned whether EPA authority is sufficient to address risks of terrorism within the context of existing laws.<sup>85</sup> The Chairman of the House Committee on Energy and Commerce asked EPA to cite its specific authority to require chemical plants to assess and reduce their vulnerability to terrorist or other criminal actions.<sup>86</sup> EPA did not respond prior to the Chairman's deadline, but she

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<sup>81</sup> "ACC teams up with railroad association to boost chemical security," *Pesticide & Toxic Chemical News Daily*, v.4, n.5, Mar. 28, 2002, p.2.

<sup>82</sup> DeConti, Angela. Personal communication, July 9, 2002.

<sup>83</sup> Hall, Tom. Personal communication, July 2, 2002.

<sup>84</sup> The Guidelines may be accessed through the Internet.  
[<http://www.aradc.org>]

<sup>85</sup> EPA. 2002. *Lessons Learned in the Aftermath of September 11, 2001*. p. 2-16, D-15.

<sup>86</sup> Letter from the House Committee on Energy and Commerce to The Honorable Christie  
(continued...)

announced in October 2002 that EPA would not pursue chemical security regulations for fear of litigation from the chemical industry.<sup>87</sup> The Committee has written to the Director of the Office of Homeland Security indicating that it would prefer to have vulnerability assessments for chemical facilities conducted by the new Department of Homeland Security.<sup>88</sup> The new chairman of the Senate Committee on Environment and Public Works is reported to agree with this view.<sup>89</sup> The chemical industry strongly prefers DHS oversight to that of EPA. Although President Bush designated EPA the lead agency on chemical security in the administration's broader homeland security strategy, Administrator Whitman later endorsed the idea that DHS would be better suited to handling that issue.<sup>90</sup>

**Collect additional information.** Another option would be to delay addressing chemical facility security until additional information is gathered on which to base proposals. The final DOJ assessment of chemical site security and the impact of the current risk management planning program is due later this year, although DOJ officials have said that release of results will be delayed. For a broader view of the issue, including analysis of policy options, Congress might establish a Blue Ribbon Panel or request a study by the National Academy of Sciences. Studies could provide information about the risks of terrorism, the risks of accidents, the views of public interest groups, and the effectiveness of public disclosure to reduce risks. Such information might assist Congress in evaluating alternative approaches to reducing risks. However, the benefits gained from delaying federal decisions pending development of better risk information must be weighed against the possibility that terrorists might strike before Congress acts.

**Improve EPA Guidance and Enforcement.** Congress also might provide additional resources for, or exercise increased oversight over, implementation of existing statutes. Although neither EPCRA nor the CAA explicitly addresses chemical releases due to criminal or terrorist acts, EPA arguably has sufficient authority under the acts to more strongly encourage facilities to reduce their vulnerability to terrorists. Additional resources could facilitate EPA review of facility risk management plans. Through September 2001, EPA had reviewed only

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<sup>86</sup> (...continued)

Todd Whitman, Aug. 9, 2002.

[[http://energycommerce.house.gov/107/letters/08082002\\_701.htm](http://energycommerce.house.gov/107/letters/08082002_701.htm)], visited Sept 6, 2002.

<sup>87</sup> Johnson, Jeff. "Security left to chemical industry," *Chemical & Engineering News*, Oct. 7, 2002, p. 6.

<sup>88</sup> Letter from the House Committee on Energy and Commerce to The Honorable Tom Ridge, June 19, 2002.

[[http://energycommerce.house.gov/107/letters/06192002\\_613.htm](http://energycommerce.house.gov/107/letters/06192002_613.htm)], visited Sept 6, 2002.

<sup>89</sup> Preston, Meredith. "Homeland security department approved without requirements for chemical plants." *Daily Environment Report*, Nov. 25, 2002, p. A-1.

<sup>90</sup> Office of Homeland Security. *The National Strategy for Homeland Security*. July 2002. p. 32.



15% of submitted plans, according to a recent report by the U.S. General Accounting Office (GAO).<sup>91</sup>

As previously mentioned, EPA already has provided guidance to facilities on this subject, but many public interest groups would like EPA to go farther in interpreting the risk management planning requirements of the CAA Section 112(r).<sup>92</sup> For example, US PIRG argued in a 1998 report:

EPA missed opportunities to require companies to identify inherently safer technologies, and ignored comments made by a coalition of environmental and labor organizations calling for a requirement that companies undertake Technology Options analyses to identify inherently safer technologies.<sup>93</sup>

In lieu of regulations, EPA could be urged to provide technical assistance or demonstration programs, or to develop incentives to encourage risk reduction.

EPA has considered revisions to either the risk management planning rule or EPA guidance under the CAA Section 112(r)(7) to require or encourage chemical facility owners to assess their vulnerability to terrorists and correct any significant weaknesses. EPA officials expected new principles for risk management planning to address both site and computer security; building access; background checks; inventory controls; storage safety; and other physical security measures, as well as changes that improve “inherent safety.”<sup>94</sup> However, EPA has stated that its authority to regulate chemical site security is unclear, and authority under the Clean Air Act has been questioned by the House Committee on Energy and Commerce.<sup>95</sup> In October, Administrator Whitman announced that EPA would not pursue chemical security regulations under the CAA.<sup>96</sup> Therefore, Congress might choose to clarify EPA authority through legislation, or examine the adequacy of EPA’s implementation of the risk management planning rule in congressional hearings.

**Reduce risk through legislation.** If Congress decides that legislation is required to reduce the risks of terrorism targeting chemical plants, proposals might focus on preventing terrorism in general or on reducing risks of terrorism specifically targeting chemical plants. A broad focus on reducing terrorism would involve numerous issues that are beyond the scope of this report. Interested readers are referred to the CRS Issue Brief IB95112, *Terrorism, the Future, and U.S. Foreign Policy*. A narrower focus on chemical plants might provide incentives for voluntary

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<sup>91</sup> U.S. GAO, p. 4.

<sup>92</sup> Hind, Rick. Legislative Director, Greenpeace Toxics Campaign. Letter to Christine Todd Whitman, EPA Administrator. March 14, 2002.

<sup>93</sup> Laplante, Allison. *Too Close To Home: A Report on Chemical Accident Risks in the United States*, U.S. Public Interest Research Group, Washington, DC. July 22, 1998.

<sup>94</sup> Heilprin, John. “Government to require 15,000 chemical, waste, water plants to assess terrorism risks, make fixes,” *The Associated Press*, via NewsEdge Insight, June 7, 2002.

<sup>95</sup> EPA. 2002. *Lessons Learned in the Aftermath of September 11, 2001*. p. ES-10.

<sup>96</sup> Preston, Meredith. “EPA Announces Strategy to Meet Homeland Protection Responsibility,” *Daily Environment Report*, Oct. 3, 2002. p. A-1.

private sector initiatives or new regulatory authorities to reduce risks. Stakeholder views regarding the relative merits of voluntary versus mandatory approaches are discussed in the next major section of this report, Policy Issues, in the subsection on Responsibility and Accountability. The remainder of the present discussion analyzes selected strategies and tactics for reducing risks that may be incorporated into legislation.

**Physical Security Enhancement.** Perhaps the most common approach to improving site security is to “harden” defenses so that sites would be less vulnerable to terrorists.<sup>97</sup> According to the recently released DOJ vulnerability assessment methodology, an effective protection system effectively serves three functions: detection (discovery or sensing of adversary action), delay (impediment to adversary progress), and response by security personnel to ensure that a threat is neutralized.<sup>98</sup> Examples of hardening tactics include increasing security patrols, strengthening fences, installing better locks on doors, relocating sensitive chemical processes within the facility, installing intruder detection systems and alarms, and performing background checks on employees. Congress has adopted such tactics in other contexts. For example, the USA Patriot Act (Public Law 107-56) requires background checks as a condition for obtaining a license to operate a motor vehicle transporting in commerce a hazardous material.

A key advantage of hardening tactics is their variety and adaptability to a range of security needs. Other advantages include the ability to deepen defenses by adding layers of protection and, in many cases, relatively low costs. A potential weakness of this strategy is that even the most effective security measures might be disabled or overwhelmed by a determined, skilled terrorist organization. For example, guards may be bribed or killed, passwords discovered, alarms short-circuited, or computers hacked. The World Trade Center and Pentagon attacks demonstrate the vulnerability of any site to a novel and vigorous attack.

**Technology Assessment and Inherently Safer Options.** An alternative strategy for reducing risk is advocated by environmental groups. It would reduce the hazardous characteristics of the facility, for example, by reducing production, processing, storage, and use of dangerous chemicals, or changing the characteristics of chemicals to make them less dangerous (e.g., by reducing volatility). Such tactics aim to improve the “inherent safety” of a site, and are preferred by advocates to target-hardening tactics, which they often refer to as “add-on safety systems.”<sup>99</sup> According to this view, “‘Inherent Safety’ activities reduce or eliminate the possibility of an accident occurring through the fundamental redesign of production systems or products, reductions in chemical inventories, or substitution for hazardous chemicals at the facility.”<sup>100</sup> Currently, there is no U.S. legislation that explicitly promotes use of safer technologies by the chemical industry.

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<sup>97</sup> National Institute of Justice, , p. 1.

<sup>98</sup> Ibid., p. 15-16.

<sup>99</sup> Laplante, Allison. *Too Close To Home: A Report on Chemical Accident Risks in the United States*, U.S. Public Interest Research Group, Washington, DC. July 22, 1998.

<sup>100</sup> Ibid.

Two potential advantages of this approach are that consequences of terrorism may be reduced even if a terrorist succeeds in his mission, and that risks associated with accidental releases of chemicals also are likely to be reduced. In addition, efforts to promote inherent safety of production could fill gaps in current laws, which address risks associated with specified chemicals and industries. According to the U.S. Chemical Safety and Hazard Investigation Board, many reactive chemicals responsible for industrial accidents are not covered by the CAA Section 112.<sup>101</sup>

Many facility operators have applied this approach in recent years. For example, a utility in Ohio chose to employ a urea-based pollution control system instead of another system which would have required storage of large quantities of ammonia.<sup>102</sup> Shortly after September 11, the Blue Plains wastewater treatment facility outside of Washington D.C. stopped using chlorine in favor of the less volatile sodium hypochlorite bleach.<sup>103</sup> Other water and wastewater treatment plants are making similar changes in chemical usage.

The key disadvantages of this “safer” facility strategy are potentially higher production and research and development costs, delays in achieving security while new processes are put into place, and, at least in some cases, lack of feasibility. However, advocates argue that use of safer technologies may reduce production costs by reducing regulatory burdens, insurance premiums, transportation costs, and waste disposal costs. Another potential disadvantage of the strategy is that some “safer” tactics may simply spread a risk around, shift the risk to other locations or populations, or substitute one risk for another. For example, in replacing an acutely toxic chemical (that produces relatively severe health effects after a short exposure) with a less acutely toxic chemical, one might increase chronic risks (due to low-level, long-term exposures) or environmental risks (e.g., due to the chemical’s persistence).

**Deterrence.** A third approach to reducing risks aims to reduce theft, rather than direct attacks, by making dangerous chemicals in use at a facility less attractive to criminals, for example, by introducing a color or other property that facilitates detection and tracking by authorities (so-called “taggants”), or by creating and storing antidotes to toxic effects.<sup>104</sup> A disadvantage of this approach is that taggants act as contaminants, and therefore may impede chemical processes. For this reason, taggants typically are useful only in end products, not in intermediate (i.e., process) chemicals. Generally, such deterrents appear to be in the development stage and are not available for immediate application.

**Restricted Access to Information.** Restricting terrorists’ access to information about vulnerability and location of chemical facilities also might reduce the risk of terrorism. This approach was taken by the 106<sup>th</sup> Congress when it enacted

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<sup>101</sup> U.S. Chemical Safety and Hazard Investigation Board website  
[<http://www.csb.gov/>]

<sup>102</sup> American electric Power, press release, Dec. 18, 2000.

<sup>103</sup> “Toxic chemicals’ security worries officials,” *Washington Post*, Nov. 12, 2001.

<sup>104</sup> Simpson, Michael. CRS Report 96-695 SPR, *Fact Sheet on Taggants in Explosives*, Jan. 21, 1997.

amendments to the CAA Section 112(r) to prevent Internet posting of risk management plans and worst-case scenarios for accidents. Internet access to information is a particular concern, because it permits anonymous inquiries about sensitive U.S. facilities from remote locations.

A key advantage of restricting access to sensitive information is that it is an inexpensive method of reducing risk. However, some argue that information restriction is contrary to American values, reduces public oversight of chemical facilities and consequently facility operators' incentives to reduce risk, and is not likely to prevent determined terrorist groups from obtaining needed information.<sup>105</sup>

The general issue of public access to facility-specific information is discussed under Key Issues, in the section on Public Disclosure.

## Key Issues

Policy makers choosing among policy options for reducing terrorist risks associated with chemical plants are faced with at least three fundamentally political issues: the effect of public disclosure; the relative importance of diverse risks (and associated costs and benefits of risk reduction), and who should be responsible (and held accountable) for achieving results.

**Public Disclosure.** Public disclosure of information about chemical hazards and risk management plans at industrial facilities is controversial.<sup>106</sup> Professional and trade groups representing the chemical industry oppose the release of information regarding the vulnerability of facilities to terrorism and the potential off-site consequences (OCA) to public health and the environment. They argue that terrorists might use the information to target facilities that are most vulnerable or located near large population centers. Congress responded to this view when it enacted amendments to the CAA Section 112(r) in 1999. The chemical industry and some policy analysts support legislation that would further restrict public disclosure of such information and exempt it from requirements of the Freedom of Information Act (FOIA). (See Legislation in the 108<sup>th</sup> Congress, below.)<sup>107</sup>

Other groups, including environmental and right-to-know advocates, oppose restrictions on public disclosure. They argue that communities have a right to be informed about hazards to which they might be exposed, and free access to information is important to ensure public accountability of facility managers. Opponents of limiting public information also point out that citizens need information to assess facility compliance with environmental laws, and if necessary,

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<sup>105</sup> Ament, Lucy. "Greenpeace maps possible chemical accidents," *Pesticide & Toxic Chemical News*, July 1, 2002, p. 9-10.

<sup>106</sup> Davis, Ann. "New alarms heat up debate on publicizing chemical risks," *Wall Street Journal*, May 30, 2002, p. A1.

<sup>107</sup> Logomasini, Angela. Senators attempt balancing security and "right to know." *CEI On Point*, n. 86, July 30, 2002. Washington, DC: The Competitive Enterprise Institute. 8 pp.

to petition EPA or the courts for enforcement.<sup>108</sup> Unsafe practices and inadequate risk management plans, in particular, should be publicized, they contend, so that communities may exert political or social pressure on plant managers to improve the inherent safety of their facilities. Moreover, these groups want access to information about similar facilities handling comparable chemicals across the United States, so that plans and accident rates can be compared and analyzed to determine the effectiveness of various safety measures. Informed citizens can work with local plant managers to reduce the risk of accidents, they argue. This view was adopted by Congress in the 1990 amendments to the CAA Section 112(r).<sup>109</sup>

A more recent argument in favor of public disclosure has been advanced by investment groups, who argue, “Investors need to know about potential liabilities of companies in which they invest.”<sup>110</sup> Information about risks related to environmental issues frequently is not reported to the Securities and Exchange Commission, even though it requires disclosure of trends and uncertainties that are reasonably likely to have an impact on companies’ profits.<sup>111</sup>

With respect to the possibility that information may be used by terrorists, right-to-know advocates claim that public disclosure of chemical hazards motivates facility operators to reduce chemical hazards, thereby reducing the likelihood and severity of harm from terrorist attacks, as well as the risk of chemical accidents.

The net effect on risk to public health and the environment of public disclosure, therefore, appears to depend on the relative risks of releases due to accidents, versus those due to terrorism, and on the extent to which those risks are reduced or enhanced by publication of risk management plans and similar information. However, data are not available to calculate risks, relative risks, or risk reduction/enhancement potential.

A related issue is the extent to which federal laws regarding public disclosure should preempt state and local disclosure laws. Public Law 107-296, establishing DHS, prohibits release under the authority of state and local disclosure laws of “information (including the identity of the submitting person or entity) that is voluntarily submitted to a covered Federal agency for use by that agency regarding the security of critical infrastructure and protected systems.”

**Relative Risks.** Another important issue involves the diverse and sometimes conflicting goals implicit in discussions of chemical site security enhancement; there is general agreement that risks should be reduced, and that “the greatest risks” should be addressed first, but little discussion of which risks are “greatest” and should be

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<sup>108</sup> American Association of Law Libraries, American Library Association, et al. Letter to U.S. Senators, July 12, 2002.

<sup>109</sup> “Coalition says response to terrorism should not limit access to information,” *Chemical Regulation Reporter*, v. 25, n. 45, Nov. 12, 2001. p. 1654.

<sup>110</sup> Frieder, Julie, Adam Kanzer, et al. Letter to U.S. Senators, July 11, 2002.

<sup>111</sup> Najor, Pamela. “U.S. Corporations fail to disclose data to SEC on environmental risks, report says,” *Daily Environment Report*, Oct. 1, 2002, p. A-10.

targeted and at what cost. For example, should we focus on lowering death rates or rates of sickness and disability? On preventive measures or emergency response and recovery services? Should we allocate resources to prevent worst-case scenarios, or everyday risks that add up over time? Are risks due to chemical terrorism worse than risks of equal or greater magnitude due to explosions or firearms? Should we emphasize measures to reduce terrorist risks that also may improve federal efforts to prepare for and respond to other disasters, as the President's National Strategy suggests?<sup>112</sup> To what extent are we willing to sacrifice access to information about facilities in our neighborhoods, privacy, or government accountability for the sake of risk reduction? Are we willing to shift federal resources to a new Department of Homeland Security and away from education, environmental protection, medical assistance, or other areas, so as to constrain government spending overall? The answers to such questions depend on value judgments and are likely to lead to diverse policy approaches and decisions about particular federal initiatives to reduce the threat of terrorism.

For example, on the one hand, it often is argued that federal expenditures are most efficient when they are allocated with respect to relative risks and risk reduction opportunities. According to this view, relatively more federal funding should be provided to programs targeting risks that are greater and more clearly documented (e.g., to prevent smoking or motor vehicle accidents), than for programs targeting small, hypothetical risks (e.g., from exposure to pesticide residues on food). Based on this reasoning, the risks of chemical terrorism in the United States would deserve relatively few resources, because they are hypothetical and very small. This is especially true for individual chemical facilities. Such reasoning might leave some chemical facilities vulnerable to attack. As explained by the President of the Louisiana Chemical Association, "Worst-case scenarios are just that: Virtually every safety system in every process would have to fail for a worst-case scenario to actually happen."<sup>113</sup> Will the federal government or plant operators find such a scenario incredible, and thus, not worth additional security investments? What cost is justified for risk reduction at individual chemical facilities?

On the other hand, some have argued that the distribution of risk is more important than the absolute or relative magnitude of risk. Scholars at the Brookings Institution, for example, argue that federal resources to combat terrorism should be devoted primarily to avoiding or mitigating potentially catastrophic terrorist acts.<sup>114</sup> Catastrophic events, in which many people are killed or injured at once often strain local social, political, and economic systems, as well as emergency response resources, as was well illustrated by the attack on the World Trade Center. Thus, the Brookings report focuses on protecting against nuclear, chemical, or biological

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<sup>112</sup> Office of Homeland Security. *National Strategy for Homeland Security*, July 2002. p. 3.

<sup>113</sup> Johnson, Jeff. Chemical accident debate rolls on. *Chemical and Engineering News*, Apr. 9, 2001. p. 22.  
[<http://pubs.acs.org/cen>]

<sup>114</sup> O'Hanlon, Michael E., Peter R. Orszag, Ivo H. Daalder, et al. 2002. *Protecting the American Homeland: A Preliminary Analysis*, Brookings Institution Press, Washington, DC. 177 p.

terrorism and large-scale attacks at airports, seaports, nuclear and chemical plants, stadiums, big commercial buildings, monuments, and American icons, as opposed to preventing numerous smaller attacks that might produce an equal number of casualties over a longer period of time.

Still others object to reliance on any form of cost-benefit accounting with respect to public health and environmental risk management, because quantitative, analytic tools often ignore risk factors and management options that they consider important.<sup>115</sup> For example, one cannot produce a reliable estimate of benefits that might accrue from basing decisions on the so-called “precautionary principle” or most other preventive management tools, because risks and clean-up costs never occur, and cannot be validated or corrected. Moreover, it can be argued that quantitative analysis is biased against preventive measures, because the hypothetical benefits, as well as the hypothetical risks, accrue (or not) in the future and generally are discounted (reduced in value). This process inevitably estimates that preventive options will have relatively high short-term costs and relatively low and uncertain long-term benefits.

**Responsibility and Accountability.** Deciding who should be responsible for achieving results (or who should be held accountable) requires consideration of many factors, including statutory authority, resource availability, technical competence, political feasibility, and moral or ethical constraints. Responsibility is multifaceted, involving financial, operational, and managerial duties, and may be layered hierarchically. In addition, responsibility may be shared or distributed among several private and public entities. For example, in the case of chemical plant safety, responsibility probably will be divided in some manner to include owners/operators of facilities, insurers, and some unit of government. It is up to policy makers to decide upon the appropriate distribution of each component.

Generally, people agree that the federal government is responsible for protecting citizens and the homeland, and that business owners are responsible for not causing hazards for their employees, neighbors, and assets. However, people have different views about who should be held accountable for the consequences of an act of terrorism, what level of protection from risk is acceptable, whether the private sector is likely to achieve that level of protection without public assistance or oversight, and who should bear the costs of achieving greater safety. These different views largely reflect general political philosophies (e.g., regarding the appropriate role of government and the value of public involvement in risk management decisions), but they also are influenced by specific knowledge of, and attitudes toward, the chemical industry, EPA, and other governmental and non-governmental entities.

Some argue that the risks of terrorism for individual chemical facilities are so small that many facility managers are unlikely to invest sufficient resources to adequately ensure site security. Based on this view, some argue that sufficient reductions in terrorist risks for the nation as a whole can be assured only if chemical

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<sup>115</sup> For more on policy issues related to risk analysis and cost-benefit analysis, see CRS Report 98-618, *Environmental Risk Analysis: A Review of Public Policy Issues*.

facilities are required to comply with federal standards for risk management, i.e., are held accountable by government. Federally mandated standards are likely to ensure a greater level of safety, according to this view, because administrative rule-making procedures provide for public comments, including comments by people potentially at risk if a terrorist attacks, but who do not directly profit from neighboring facilities. Voluntary chemical site security measures advocated by trade associations do not suffice, it is argued, because they have no standards, no timelines, no hazard reduction policies, no measurable hazard reduction goals, no accountability, and are not enforceable.<sup>116</sup>

If Congress agrees that the private sector must be held accountable, legislation could be enacted authorizing EPA or the Department of Homeland Security to conduct or oversee facility vulnerability studies or to set standards for facility risk management. The Chairman and Ranking Member of the Senate Committee on Environment and Public Works in the 107<sup>th</sup> Congress expressed a preference that EPA lead such an effort,<sup>117</sup> but the current Chairman of the same Senate committee and the Chairman of the House Committee on Energy and Commerce prefer leadership by the new Department.<sup>118</sup>

Others contend that chemical facility operators are willing and prepared to reduce significant risks, for personal, professional, and business reasons.<sup>119</sup> They argue that well-managed businesses routinely assess, prioritize, and manage risks of all kinds, including risks of potential exposure to hazardous chemicals due to criminal or terrorist acts. Business incentives to good chemical risk management include reduced legal liability, reduced insurance costs, enhanced reputation, improved employee relations, and reduced costs for remediation and victim compensation. In the United States, environmental and occupational health and safety laws provide additional incentives to many facility operators to responsibly manage hazardous chemicals.

Many, including the Bush Administration, are opposed to new legislation, which, they argue, may disrupt and delay installation of security enhancements by individual companies. On the other hand, if such legislation were enacted, it could benefit businesses by shifting liability to the government and discouraging states from adopting diverse regulatory strategies.

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<sup>116</sup> Orum, Paul. Additional testimony in response to questions from Senator Jon Corzine concerning the Chemical Security act, S. 1602, Jan. 15, 2002. [<http://www.rtk.net/wcs/test4.html>]

<sup>117</sup> “EPA should take lead on water, chemicals in homeland security measure, Senators say,” *Daily Environment Report*, July 23, 2002, p. A-2-3.

<sup>118</sup> Letter from the House Committee on Energy and Commerce to The Honorable Tom Ridge, June 19, 2002. [[http://energycommerce.house.gov/107/letters/06192002\\_613.htm](http://energycommerce.house.gov/107/letters/06192002_613.htm)], visited Sept 6, 2002.

<sup>119</sup> Zahodiakin, Phil. 2002. “Industry sees few unturned stones in anti-terror effort,” *Pesticide & Toxic Chemical News*, Mar. 18, 2002, p. 10.



Industry representatives acknowledge that some guidance, training, and financial assistance for threat assessment and risk management are needed, especially for addressing risks to small businesses, but note that trade associations and industrial research centers have been working for several years to fill such needs. Such groups advocate a flexible, risk-based approach to securing facilities, arguing that “most plants are not likely terrorist targets.”<sup>120</sup> The ACC favors “public-private partnerships that allow industry to do as much as they can on their own with perhaps guidance [from government].”<sup>121</sup> Business groups argue that most regulations inappropriately force diverse enterprises to adopt a “one-size-fits-all” strategy. To satisfy any public demand for assurance that risk reduction is occurring, some industry representatives have recommended a safety certification process and are willing to submit their facilities to independent audits.

The Bush Administration hopes to avoid legislation to enhance security measures at chemical facilities, according to the Secretary of the Department of Homeland Security, Tom Ridge.<sup>122</sup> He acknowledged that the Administration had been considering a regulatory approach to ensure site security a few months ago, but more recently (as of mid-July, 2002) has been leaning toward a voluntary approach. The change “reflects an acceptance by industry of a need ... to do a better job of securing their facilities,” Director Ridge explained.<sup>123</sup>

The Administration also would assign financial responsibility to chemical facility owners. According to Ridge, “[T]his is a cost [chemical companies] have to absorb.” For their part, some pesticide trade groups would welcome increased government assistance in the form of funding for education.<sup>124</sup>

## Legislation in the 107<sup>th</sup> Congress

The 107<sup>th</sup> Congress did not enact legislation to reduce risks of terrorism at facilities handling potentially dangerous chemicals. Public Law 107-296, establishing the Department of Homeland Security (DHS), does not address chemical plant security directly. However, if facilities are part of the “critical infrastructure” (e.g., water utilities), the law will require DHS to analyze vulnerabilities and recommend methods of enhancing site security. The law exempts from public disclosure requirements (i.e., FOIA) information submitted voluntarily to DHS by such facilities about physical and cyber security for use by that agency related to “the security of critical infrastructure and protected systems.” Disclosure under the authority of state or local laws also is prohibited. Unauthorized disclosure of “critical

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<sup>120</sup> Ibid.

<sup>121</sup> Preston, Meredith, and Pat Phibbs. 2002. “EPA developing principles to identify, address facilities vulnerable to terrorism,” *Daily Environment Report*, June 6, 2002. p. A-4.

<sup>122</sup> Preston, Meredith. “Administration wants to avoid legislation requiring safety measures at chemical sites,” *Daily Environment Report*, July 11, 2002, p. A-6.

<sup>123</sup> Ibid.

<sup>124</sup> Ibid.

infrastructure information” by government employees is punishable by imprisonment, fines, and removal from office.

In the 108<sup>th</sup> Congress, legislation addressing risks of terrorism targeting chemical facilities that handle large quantities of hazardous chemicals reportedly is a priority of the new Chairman of the Senate Committee on Environment and Public Works, but he has not yet introduced a proposal. In accord with the views of the Bush Administration, the Chairman would like DHS to oversee chemical plant security.

Two bills addressing the issue, S. 6, Title X and S. 157, have been introduced. The bills would build on existing EPA authority to oversee chemical facilities, but would require consultation with DHS. Both bills are similar to S. 1602, as reported in the 107<sup>th</sup> Congress (S.Rept. 107-342). They would require EPA to designate “certain combinations of chemical sources and substances of concern” as high priority categories based on the severity of the threat posed by an unauthorized release, proximity to population centers, and other criteria, and to require owners and operators of facilities within high priority categories to conduct vulnerability assessments, identify hazards, and prepare prevention, preparedness, and response plans to eliminate or significantly lessen the potential consequences of an unauthorized release. Copies of vulnerability assessments and plans would be submitted to EPA and updated periodically.

S. 6 and S. 157 would protect vulnerability assessments and plans from public disclosure under FOIA, but the non-disclosure provisions of these bills differ considerably from those in P.L. 107-296. Generally, compared to the law’s exemption from FOIA for voluntarily submitted “critical infrastructure information,” the Senate bills introduced to date appear to exempt a narrower range of information from disclosure under FOIA, equivalent to exemptions allowed by FOIA itself. In addition, the bills would allow disclosure of information under state or local laws, if the state or local government received the information independently of DHS. And they provide no civil liability immunity for those who submit information nor criminal penalties for unauthorized disclosure. For more on issues related to information disclosure, see CRS Report RL31547, *Critical Infrastructure Information Disclosure and Homeland Security*.

S. 6 and S. 157 direct EPA to review each assessment and plan, determine compliance, and certify that determination. The bills provide for early review and certification of assessments and plans submitted before EPA issues regulations. EPA would be authorized to issue compliance orders 30 days after notifying a chemical source that its assessment or plan is inadequate and offering compliance assistance, if the plan is not revised to comply with EPA requirements. If DHS notified a chemical source that its plan or implementation was insufficient to address a threat of terrorist attack, and the chemical source took inadequate action in response to that notice, DHS would be authorized to secure necessary relief to abate the threat from the district court in which the threat exists.

## Conclusions

The threat of terrorism in the United States challenges the existing balance maintained in federal laws between the public's right to know about chemical hazards and the chemical industry's right to protect confidential business information. At issue are risks to public health and safety, environmental protection, civil rights and duties, national security, and privacy. Some are advocating a strategy of relative risk analysis and analysis of risk management options to reveal the best course of action. However, information appears to be inadequate for quantitative evaluation of the risks of chemical releases, whether deliberate or accidental, and the nature of terrorism makes prediction difficult. Moreover, there is no universally accepted level of tolerable risk, no obvious basis for a comparison of relative risks and benefits, and no established federal mechanism for ensuring responsible management of the risks of chemical terrorism.

The 107<sup>th</sup> Congress did not enact legislation to reduce risks of terrorism at facilities handling large quantities of potentially dangerous chemicals. However, it established a new Department of Homeland Security to analyze vulnerabilities of "critical infrastructure" and recommend methods of enhancing site security. Legislation in the 108<sup>th</sup> Congress (S. 6, Title X, and S. 157) would build on existing EPA authority to oversee chemical facilities, while requiring consultation with DHS. Both bills are similar to S. 1602, as reported in the 107<sup>th</sup> Congress (S.Rept. 107-342). They would require EPA to designate "certain combinations of chemical sources and substances of concern" as high priority categories and to require owners and operators of facilities within those categories to conduct vulnerability assessments, identify hazards, and prepare and implement prevention, preparedness, and response plans. These bills are opposed by the Bush Administration which would prefer to give DHS primary authority to regulate chemical facilities.