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Chemical Plants Vulnerable to Attack

Security protection at some facilities is inadequate, national standards nonexistent

America's law enforcement agencies and the media have given considerable attention to the potential threat of chemical or biological weapons of mass destruction being used in a terrorist attack. To succeed in launching a chemical or biological attack, terrorist groups may have to acquire scientific know-how on creating dangerous compounds or to import such agents from supportive foreign sources. Hence, the nation's military and intelligence establishments are actively pursuing suspected weapons of mass destruction programs in countries such as Iraq and North Korea.

There exists however, another, and perhaps more easily penetrable domestic vulnerability—American manufacturing facilities that produce and store toxic chemicals for various industrial uses. These facilities could be targeted using less sophisticated methods, such as explosives, resulting in potentially devastating damage to the surrounding environment as dangerous compounds are released into the air and water supply. Yet, despite the fact that Americans recognize the importance of thwarting terrorist access to weapons of mass destruction, no federal standards exist to mandate security protection for chemical plants on U.S. soil.

Enhancing physical security at U.S. chemical plants can thwart future attempts to sabotage these facilities and deter new generations of terrorists from considering this industry a viable target in their planned endeavors.

Vulnerability of the industry

There are 15,000 chemical facilities that handle large quantities of toxic or flammable substances in the United States—many of them located near major metropolitan areas, and almost all strategically placed next to major thoroughfares. According to the U.S. Environmental Protection Agency (EPA), 123 chemical facilities in the United States are located in the vicinity of one million or more residents. More than 700 plants could put at least 100,000 people at risk, and more than 3,000 facilities have at least 10,000 people nearby. Dangerous chemicals are also transported in thousands of vehicles every day, including trucks, rail cars and ships. Facilities using chemicals that pose the greatest threats to local populations include industrial chemical manufacturers (chlorine and a range of other chemicals), water treatment facilities

(chlorine), oil refineries (petroleum by-products and chlorine), plastics manufacturers (vinyl chloride), and agricultural fertilizer and pesticide producers (ammonia and methyl isocyanate).

Potential terrorist attacks aimed at chemical facilities can be classified into two broad categories: direct attacks on facilities or chemicals being stored or transported, and covert use of business contacts, facilities or information to gain access to materials. In either case, terrorists could be insiders or outsiders and may use traditional or non-traditional weapons including explosives, incendiary devices, firearms, airplanes, computer programs or weapons of mass destruction such as nuclear or radiological bombs.

Following the terrorist attacks of 2001, the EPA has developed a series of disaster scenarios for personnel training purposes. The scenarios, which were based on an assessment of possible effects of terrorist sabotage on existing facilities, included the following:

- A suburban California chemical plant routinely loads chlorine into 90-ton railroad cars that, if ruptured, could poison more than 4 million people in Orange and Los Angeles counties.
- A Pennsylvania refinery keeps 400,000 pounds of hydrogen fluoride that could asphyxiate nearly 4 million nearby residents.
- A New Jersey chemical company's 180,000 pounds of chlorine or sulfur dioxide could form a cloud that could threaten 12 million people.

The 1984 tragedy at a Union Carbide pesticide plant in Bhopal, India, serves as a sobering reminder of what can happen when chemical agents are released into densely populated residential areas. The accidental release of methyl isocyanate from a storage tank at the facility exposed an estimated 520,000 people to the toxic chemical. As a result of the accident, a total of 16,000 people died, and another 120,000 had to seek medical attention. The Bhopal tragedy rep-

(continued on next page)

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resents the potential devastation from accidental release of dangerous chemicals from just one tank in a plant—the effects of a well-planned and coordinated act of sabotage affecting an entire plant could be exponentially more tragic.

Terrorists aware of target

Over the last ten years there has been a marked increase in the number of plots against chemical plants by terrorists worldwide. Most of these attempts were in war zones abroad: they included attacks on plants producing fertilizer and light fraction petroleum products; a pharmaceutical factory using ammonia and chlorine; and a number of plants producing pesticides. At least two attempts to release chemicals from facilities occurred in the United States as well: one involved a large propane storage facility, and the other a gas refinery.

There is credible evidence that United States chemical facilities may be high on the list of potential targets of terrorist organizations such as al Qaeda. Testimony at the trial of the 1993 World Trade Center 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. In December 2001, raids on al Qaeda hideaways uncovered a collection of chemical trade publications, suggesting a focus on learning about access to and the dangers of various chemical compounds.

Experts from the scientific, intelligence and law enforcement communities suggest that while a high degree of sophistication may be required to cause mass casualties using most types of chemical and biological agents, little sophistication is necessary to disseminate toxic industrial chemicals that can be found in abundance in or near most metropolitan areas. Hence, America's industrial chemical plants could be on the short list of targets for terrorist organizations looking to carry out a maximum impact incident without having to invest in sophisticated training or technology.

Lack of security preparedness

Currently, no defined national strategy exists for protecting chemical plants, and no federal regulations cover security at these facilities. There are also no state regulations that specifically address security at chemical manufacturing facilities. A trade group known as the American Chemistry Council requires members to follow security code guidelines that include threat assessments, security process analyses, training drills, internal audits and verification by a third party. But to date, only 1,000 of the country's 15,000 chemical plants have adopted these guidelines and drafted risk mitigation plans addressing acts of terrorism.

An independent assessment by the Agency for Toxic Substances and Disease Registry revealed that the general level of security at chemical plants ranged from fair to very poor, chemical plant security managers were pessimistic about their ability to deter sabotage by employees (yet employee background checks had not been implemented in many cases) and corporate security staff were not trained to identify combinations of common chemicals at their facilities that could be used as improvised explosives or incendiaries. A recent follow-up report by the General Accounting Office concluded that voluntary security enhancement initiatives taken by chemical facilities since September 11, 2001, have been inadequate.

Investigative reporting by journalists in Pittsburgh, Houston, Baltimore and Chicago confirmed these findings: security was so lax at many of the plants investigated that reporters could walk or drive up to tanks, pipes and control rooms considered key targets for terrorists. Problems with unguarded rail lines or drainage ditches, dilapidated or non-existent fences, open doors, inoperable cameras and unprotected entry gates were reported at more than half of the sites visited by reporters.

At the same time, public sector emergency responders are also unprepared for handling the potentially devastating aftermath of a chemical plant

attack. According to a report just released by the Council on Foreign Relations, some local police units do not have safety gear necessary to function in an environment contaminated by toxic chemicals, and many public health departments do not have basic equipment or expertise to deal with chemical attacks or releases.

To reduce the magnitude of potential devastation resulting from an attack on a chemical plant, some public policy experts suggest instituting long-range regulations to reduce the amount of hazardous substances, use fewer hazardous materials, institute less hazardous procedures and simplify plant design and processes. However, many of these proposals involve an extended time horizon for implementation, and some remain controversial within the chemical industry.

In the meantime, the focus must remain on individual chemical plants enhancing their security to deter and prevent sabotage and terrorism.

Federal legislation pending

Currently, the only federal legislation affecting security at chemical facilities is the Clean Air Act. The scope of the legislation is limited to accidents and does not address the threat of terrorism.

Legislators in Washington have been considering Congressional action to tighten security at chemical plants for over a year. Senator Jon Corzine (D-N.J.) has introduced the Chemical Security Act (S. 157), which would require the EPA to work with the Department of Homeland Security (DHS) to identify high-priority chemical plants based on the volume and toxicity of chemicals produced or stored, as well as the plants' proximity to population centers. EPA and DHS would then develop regulations to require these "high-priority" chemical plants to conduct vulnerability assessments and to implement response plans that include security improvements and safer technologies. These regulations would require every plant to make use of the safest chemicals, technologies and processes.

Another bill, the Chemical Facilities Security Act of 2003 (S. 994), sponsored by Senator James Inhofe (R-Okla.) and supported by President Bush, would give the DHS alone the authority to draft regulations requiring chemical plant operators to conduct vulnerability assessments and to prepare site security plans. The bill would require companies to implement counterterrorism measures and to certify that they undertook counterterrorism initiatives, but would not mandate the use of safer chemicals in manufacturing processes. Chemical plant operators could also petition the Secretary of Homeland Security to endorse security standards voluntarily developed by the chemical industry. The latter provision has been seen by Corzine and other opponents of Inhofe's bill as an attempt to retain the self-policing status quo.

Security enhancements needed urgently

While Congress considers the future of government regulation over the chemical industry, chemical plants from coast to coast remain vulnerable to attack. The debate over long-range planning to reduce the hazards present in chemical plants must not be considered as a substitute for urgently needed enhancements to the physical security programs at chemical plants. These enhancements must be developed and implemented throughout the industry as rapidly as possible.

Each facility that handles, stores or produces toxic chemicals should rigorously review its current security procedures to make sure that all necessary steps are taken to secure the facility. The following are some of the recommended first steps to establishing an effective security program:

- Conduct a comprehensive risk assessment survey to determine potential areas of vulnerability and risk levels. The assessment should focus on all aspects of the security program to include an evaluation of physical barriers, protective lighting, security hardware and

(continued on next page)

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procedural controls in place at the facility.

The assessment should also include an audit of the facility's inventory control processes that govern important information about access to dangerous chemicals.

- Identify the location of all toxic substances at the facility and know the specific hazards related to the release of each substance.
- Conduct comprehensive pre-employment background checks for all personnel assigned to the facility, including temporary and permanent on-site contractors. This process should include checking for criminal records, screening for illegal drugs and obtaining references from personal acquaintances, as well as from previous employers.
- Develop a comprehensive physical security program to reduce the opportunities for unauthorized entry and sabotage. Focus areas should include access control procedures and site surveillance. Procedures should be set in place to alert security personnel if any suspicious activity occurs, or if any amount of potentially toxic substances is unaccounted for.
- Provide continuous training for all security personnel assigned to the facility, paying particular attention to the prevention of trespassing and unauthorized entry. Consideration should be given to certifying all security personnel in First Aid and CPR, so that security personnel could provide life-saving measures in the event of a chemical release.
- Develop an emergency plan, which clearly specifies the role of security personnel in the event of an accidental or intentional release of chemicals. The plan should assign tasks to specific individuals to handle any foreseeable crises that may occur. This plan should also convey clear instructions on how to lock down and evacuate the premises, as well as how to communicate with employees and their fami-

lies during and after an emergency situation.

Plans should address scenarios involving different chemical agents, various amounts of each agent being released and the possible effects of interaction between two or more compounds. Businesses must disseminate the details of these plans to personnel on a regular basis and conduct drills to help ensure their effectiveness in an actual emergency.

- Establish a liaison with local fire department, law enforcement and hospital representatives to discuss operations at the facility and to determine response capability in the event of a chemical release.
- Develop an employee security awareness program and conduct initial and ongoing educational sessions. Employees can be instrumental in helping identify suspicious activities.

According to the National Transportation Safety Board and the U.S. Coast Guard, a large leak of chlorine gas can travel two miles in only 10 minutes and remain acutely toxic to a distance of about 20 miles. The Bhopal tragedy was not the result of a terrorist attack and yet caused thousands of deaths—a terrorist attack on such a toxic chemical plant could result in up to 2.4 million casualties, according to the U.S. Army Surgeon General. Although the chemical industry in the United States has a good safety record, some chemical plants in the country have not comprehensively assessed their vulnerability to a terror attack. And the danger that such an attack can occur is now more imminent than ever before.



The Lipman Report Editors