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**Before the
Surface Transportation Board
on**

**REDUCING THE CONSEQUENCES OF A TERRORIST ATTACK ON RAIL
SHIPMENTS THROUGH SAFER MORE SECURE CHEMICALS & TECHNOLOGIES**

Testimony of:

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"We can no longer continue to risk the lives of millions of Americans by using, transporting and storing highly toxic chemicals when there are safer alternatives commercially available. It is time for the nation's big chemical companies to stop making the dangerous chemicals that can be replaced by safer substitutes or new technologies currently in the marketplace...And if they won't do it, Congress should do it for them in the Chemical Facility Anti-Terrorism Act of 2008."

--- Association of American Railroads, February 2008

The September 11th terrorist attacks successfully used our own infrastructure against us with tragic results. They also demonstrated that tight perimeter security, such as in the case of the Pentagon, is incapable of preventing such attacks. Should a chemical plant be targeted, a truck bomb, a small plane, helicopter or a high powered rifle would easily render the industry's current reliance on fence-line security totally useless. In fact, U S chemical facilities have been referred to as ***"pre-positioned"*** weapons of mass destruction (WMD).

The vulnerability of U S chemical plants to terrorism and serious accidents such as the 1984 disaster in Bhopal, India have been widely recognized. The potential magnitude of these risks surpasses the 9/11 attacks. Once released these chemicals and gases can remain dangerous for up to 14 miles in an urban area (20 miles in a rural area) and put the lives of millions of people at risk.

The nature of these risks meets any definition of a weapon of mass destruction. The manner in which people would be killed and injured is terrifying. Poison gases such as chlorine will literally melt the lungs of its victims causing them to drown in their own lung fluid (pulmonary edema). Survivors could be left with life long disorders.

Although we would all like to believe the threat of a terrorist attack is unlikely, U S intelligence officials now believe terrorist attacks are more likely today than before the U S invaded Iraq in 2003 (September 24, 2006 N Y Times).

Following the 9/11 attacks it was reported that 9/11 ring leader, Mohamed Atta, visited a Tennessee chemical plant asking lots of questions (December 16, 2001 Washington Post). In the first six months of 2007 at least five successful terrorist attacks in Iraq used relatively small (150 to 250 pound) cylinders of chlorine gas to kill dozens of people. As a result the Department of Homeland Security (DHS) began briefing local bomb squads and chemical plants across the country (April 24, 2007 USA Today).

In February and April of 2007 thefts of 150 pound cylinders of chlorine gas occurred in California prompting questions by members of this Committee to the DHS about their response to these thefts, any other thefts and plans to eliminate these vulnerabilities by using inherently safer technologies.

U S chemical facilities were not built or designed to defend against terrorist attacks. And predicting where an attack will take place is a fool's errand. No one predicted that a Gulf War veteran, Timothy McVeigh, would attack the Federal Building in Oklahoma City in 1995, killing 168 innocent people.

On June 25, 2007, DuPont Chairman Charles O. Holliday Jr. told the media that he worries most about a computer system failure or a security breach at one of the company's chemical plants around the world. "I feel very comfortable that we've taken all the reasonable steps, but

obviously if someone wants to fly an airplane into a plant, it's very hard to guard against it," said Holliday

The nation's most infamous example of this threat is the Kuehne Chemical Company in South Kearny, New Jersey. According to Kuehne's own reports to the U.S. Environmental Protection Agency (EPA), their plant puts 12 million people in the Newark-New York City region at risk in the event of a catastrophic release of chlorine gas stored on site. This is the largest single chemical plant risk in the nation, but according to the DHS more than 3,000 other plants each put 1,000 or more people at risk. More than 100 U.S. plants each put a million or more people at risk, according to their reports to the EPA.

What makes the Kuehne plant inherently dangerous is the use of large quantities of chlorine gas to produce relatively harmless liquid bleach (sodium hypochlorite). While Kuehne's largest business is water disinfection, there are many safer alternatives to chlorine, including ultra-violet light, ozone and liquid bleach. A competitor of Kuehne, KIK Custom Products, wrote Representative Edward Markey (D-MA) a member of the House Homeland Security Committee on July 26, 2006. In their letter KIK committed to converting to a safer technology that produces "high strength liquid bleach in one continuous operation thereby eliminating the need to ship or store chlorine" on site and therefore eliminating the risks posed by large quantities of chlorine gas. KIK is the second largest producer of household bleach in North America. More details on their technology are at <http://www.k2pure.com/>

K2pure's new just-in-time process for producing chlorine gas will not only eliminate the need for bulk shipments of chlorine gas but will limit on-site storage to about 50 pounds at any one time.

Freight Rail Equally Vulnerable:

Our nation's railroads are equally vulnerable to attack. The 0.3 percent of freight rail cargo that contains toxic-by-inhalation (TIH) gases is a sitting duck for terrorists, a threat to millions of Americans and an enormous liability for the railroads. Fortunately the TIH gases have safer alternatives. Chemical makers and users should begin a rapid conversion to safer materials or processes. A wide variety of plants have already begun this process but Congress needs to level the playing field and speed it up. Congress is now considering the "Chemical Facility Anti-Terrorism Act of 2008" (H.R. 5577) which was adopted by the Homeland Security Committee on March 6, 2008 (see examples on pages 6-7).

In 2007 Congress passed the "Implementing Recommendations of the 9/11 Commission Act of 2007." Section 1551 requires the Department of Transportation to "ensure that the final rule requires each railroad carrier to select the safest and most secure route to be used in transporting security-sensitive materials." It also allows the use of "interchange agreements" to make re-routing easier (using shorter distances) by having railroads swap cargo instead of re-routing exclusively on one rail carrier.

If properly implemented, re-routing around major cities is the fastest step that can be taken to dramatically reduce catastrophic risks. However, re-routing is no substitute for converting chemical facilities that make, store or use TIH gases and thereby eliminate the need to transport bulk quantities of TIH gases.

What Happens When Plant Security Fails?

Continuing negligence by industry or government will not be judged kindly by posterity. Stephen Flynn, Senior Fellow in National Security Studies at the Council on Foreign Relations wrote in his book, *America the Vulnerable*, "*The morning after the first terrorist strike on this sector*,

Americans will look around their neighborhoods and suddenly discover that potentially lethal chemicals are everywhere, and be aghast to learn that the U.S. government has still not developed a plan to secure them. The subsequent political pressure to shut down the industry until some minimal new safeguards can be put in place – as we did with commercial aviation following the 9/11 attacks – will be overwhelming.”

— In July, 2004, the Homeland Security Council estimated that an attack on a single chlorine facility could kill 17,500 people, severely injure an additional 10,000 and result in 100,000 hospitalizations and 70,000 evacuations.

— In January, 2004, the U S Naval Research Laboratory testified before the Washington, D C City Council warning that 100,000 people could be killed or injured in the first 30 minutes of a catastrophic release of a tank car of chlorine or similar chemical within blocks of Capitol Hill. They further estimated that people could **“die at rate of 100 per second.”**

— In June, 2003 FBI specialist on weapons of mass destruction, Troy Morgan, in a speech at a chemical industry conference warned, **“You’ve heard about sarin and other chemical weapons in the news. But it’s far easier to attack a rail car full of toxic industrial chemicals than it is to compromise the security of a military base and obtain these materials.”**

Prioritize the Most Dangerous Chemicals:

The largest category of hazardous substances that can be transformed into chemicals of mass destruction are TIH gases. According to the U S EPA just four TIH gases account for 55 percent of all chemical processes that threaten communities nationwide. These are

anhydrous ammonia --- 32.5% (8,343 processes)
chlorine --- 18.3% (4,682 processes)
sulfur dioxide --- 3% (768 processes)
hydrogen fluoride --- 1.2% (315 processes)

Safer Technologies Can Eliminate the Consequences of an Attack:

While these chemical processes deserve high priority because of their prevalent use at thousands of facilities, especially at high threat facilities, there are widely available safer alternatives for each of them. For example, the Center for American Progress (CAP) conducted an analysis of EPA’s Risk Management Program data and identified 284 facilities that have converted since 1999. See full report at

http://www.americanprogress.org/issues/2006/04/b681085_ct2556757.html

Examples of conversions from these chemicals and continuing threats include

*** More than 200 water treatment facilities (including Washington, D C) converted to safer alternatives such as ultraviolet light, eliminating the use of chlorine and sulfur dioxide gas. But over 100 water treatment plants still threaten more than 100,000 people.

*** Ninety-eight petroleum refineries use safer alternatives to hydrogen fluoride (HF). But 50 refineries still threaten millions of people with the use of HF.

*** At least 36 electric power plants use safer alternatives to anhydrous ammonia gas such as dry urea. But 166 power plants still use anhydrous ammonia gas, each threatening an average of 21,506 people.

While the CAP analysis proves the technological feasibility of safer alternatives, CAP estimates that at this rate of conversion, without any new regulatory requirements, it will take 45 years to eliminate hazards that pose the highest risk to America's hometowns

The CAP analysis shows that 87% of the converted facilities spent less than \$1 million and half spent less than \$100,000. Clearly these conversion costs pale in comparison to the cost of disaster response, relocating communities, defending against personal injury law suits or resolving environmental clean up liability or even conventional security costs

A 2006 GAO report (GAO-06-150), Homeland Security DHS Is Taking Steps to Enhance Security at Chemical Facilities, But Additional Authority Is Needed, concluded, **"Implementing inherently safer technologies potentially could lessen the consequences of a terrorist attack by reducing the chemical risks present at facilities, thereby making facilities less attractive targets."**

A Government Accountability Office report (GAO-05-165) identified chlorine gas and 90-ton chlorine rail cars as **"among the top five terrorist-related wastewater system vulnerabilities."** Among the top three recommendations **"Replacing gaseous chemicals used in wastewater treatment with less hazardous alternatives."** In addition, the largest majority of experts gave replacing these chlorine facilities the highest priority for federal funding

Examples of Safer Technologies at water facilities:

For example, the Blue Plains sewage treatment plant in Washington, D C halted its use of chlorine gas and switched to safer chemicals 90 days after the 9/11 attacks due to fears of another attack. The plant had seven rail cars of chlorine gas on site following the 9/11 attacks. The conversion cost approximately \$0.50 per year for each water customer.

Bleach and water disinfectant formulators are well positioned to guide their customers toward even more promising alternatives such as ozone and ultra-violet light (UV) which are widely available and do not pose catastrophic hazards. UV is superior to chlorine gas or chlorine bleach because it also kills deadly anthrax and the parasite cryptosporidium which chlorine gas is not as effective on. — In 1993 more than 100 people were killed and 400,000 were made sick by cryptosporidium when it overwhelmed the chlorine gas treated drinking water system of Milwaukee, Wisconsin.

Benefits of Safer Technologies:

The use of safer technologies offers a more competitive and stable business plan with fewer regulations, potentially zero liability, sustainable profitability, better relationships with workers and neighboring communities and no threat of a catastrophic attack or accident. Specifically, the use of safer technologies will likely result in a facility no longer being subject to DHS's CFATS regulations.

Obviously, chemical facilities located on site at nuclear power plants, water treatment works, iconic facilities such as Disney World, Camp David, etc. also need to be considered for priority protection. However, using safer technologies as a countermeasure at these facilities will lessen the lethality that an attack on them would pose. DHS will also be able to better utilize its limited resources (\$63 million for chemical security in FY 2009) for more effective use of conventional security measures to defend against and respond to attacks on targets even where a chemical risk is removed.

Given DHS's finite resources and the late start the nation has in addressing chemical security it is urgent that we use safer technologies to mitigate the consequence of an attack. By doing so we eliminate risks, safeguard communities and save scarce money and resources to protect targets that cannot be so neutralized (airports, U S Capitol, etc)

Buffer Zones:

According to the EPA (Belke, 2000), the high number of facilities that put residents at risk as far as 14 to 25 miles away from a release "is primarily due to the prevalent use of 90-ton rail tank cars for chlorine storage." The Chlorine Institute pamphlet 74, "Estimating the Area Affected by a Chlorine Release" (1998), shows a plume can be hazardous up to 41.5 miles.

The Bureau of Alcohol Tobacco, Firearms, and Explosives regulations (27 CFR 555.218) prohibits the storage of a similar quantity of explosives within 2,010 feet of inhabited buildings.

In 2006 the Netherlands and Akzo Nobel completed a \$270 million program to relocate chlorine production facilities within Holland to a location that will eliminate the transport of chlorine by rail in the Netherlands.

Given the large potential plume of toxic-by-inhalation substances and large quantities of some flammables such as propane, a much larger buffer zone is called for with regard to high risk TIH facilities.

Without the use of safer technologies to convert existing plants into safer functioning plants, relocating them to more remote areas should be an option, especially if an owner/operator insists that there is no safer alternative.

New facilities should be prohibited from locating in densely populated areas.

Deadly Accidents

The 1984 Union Carbide's Bhopal, India plant had the worst industrial accident in history. Forty tons (half a rail car) of methylisocyanate (MIC) leaked into the community at midnight killing 8,000 people within days and claiming another 12,000 lives since.

In June, 2004, three people were killed in a train accident in a remote area southwest of San Antonio, Texas when a tank car carrying chlorine broke open in the 25 mph crash, releasing a portion of the tank car contents.

On January 6, 2005 ten people were killed, 58 hospitalized and hundreds sought treatment in Graniteville, South Carolina when chlorine was released again when one train slammed into a parked train in the middle of the night. The cars involved were allegedly state of the art construction.

Both of these tragedies could have resulted in a much higher number of fatalities and injuries if they had occurred in densely populated areas.

Examples of "Methods to Reduce the Consequences of a Terrorist Attack" in H.R. 5577 Sec. 2110 include:

"METHOD TO REDUCE THE CONSEQUENCES OF A TERRORIST ATTACK—For purposes of this section, the term 'method to reduce the consequences of a terrorist attack' includes—

(1) input substitution,

- (2) catalyst or carrier substitution,
- (3) process redesign (including reuse or recycling of a substance of concern),
- (4) product reformulation,
- (5) procedure simplification,
- (6) technology modification,
- (7) use of less hazardous substances or benign substances,
- (8) use of smaller quantities of substances of concern,
- (9) reduction of hazardous pressures or temperatures,
- (10) reduction of the possibility and potential consequences of equipment failure and human error,
- (11) improvement of inventory control and chemical use efficiency, and
- (12) reduction or elimination of the storage, transportation, handling, disposal, and discharge of substances of concern "

Additional Expert Opinions on Safer Technologies:

2006 GAO report (GAO-06-150), Homeland Security DHS Is Taking Steps to Enhance Security at Chemical Facilities, But Additional Authority Is Needed, concluded, **"Implementing inherently safer technologies potentially could lessen the consequences of a terrorist attack by reducing the chemical risks present at facilities, thereby making facilities less attractive targets."**

May 2006 report by the National Academy of Sciences, "Terrorism and the Chemical Infrastructure Protecting people and Reducing Vulnerabilities," recommended more research on new technologies but stated, **"The most desirable solution to preventing chemical releases is to reduce or eliminate the hazard where possible, not to control it. This can be achieved by modifying processes where possible to minimize the amount of hazardous material used, lower the temperatures and pressures required, replace a hazardous substance with a less hazardous substitute, or minimize the complexity of a chemical process."**

Retired Rohm and Haas engineer, Dennis Hendershot advised, **"The first solution to a process safety problem should always be to get rid of the hazard, not control it."**

Trever Kletz, formerly with Imperial Chemical Industries (ICI) said, **"The very best way to prevent an explosion is to simply replace the material that explodes with one that does not or at least keep the stock down so low that it hardly matters if it all leaks out."**

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